

BESSEMER

OIL FIELD ENGINES
- COMPRESSORS -
VACUUM PUMPS -
ROLLER PUMPING
POWERS - - - - -

BESSEMER GAS ENGINE CO.
GROVE CITY, PA.



THE BESSEMER GAS ENGINE CO.

CAPITAL \$3,000,000.00 OUTSTANDING

John Carruthers, *President*

Arthur J. Hull, *Vice-President*

John McCune, Jr., *Secretary*

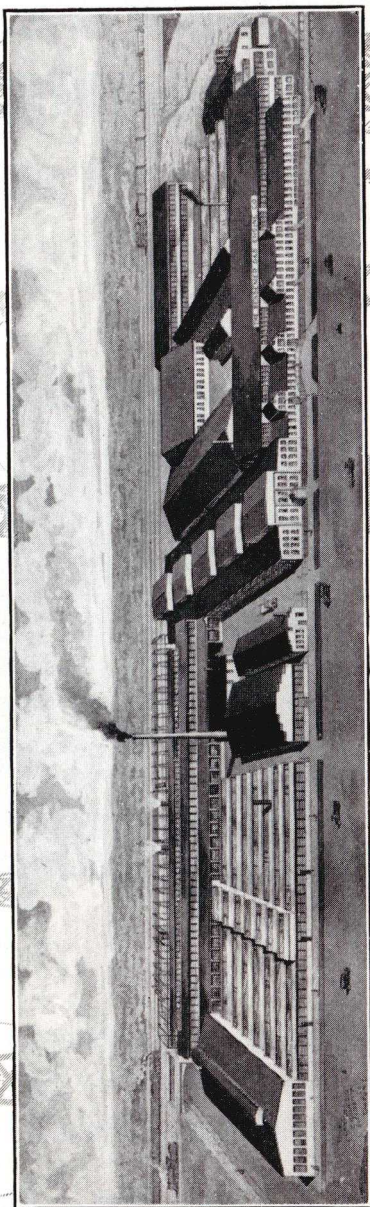
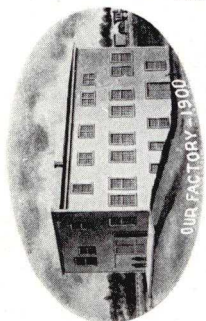
E. J. Fithian, *Treasurer*



CATALOGUE No. 105

HOME OFFICE AND WORKS
Grove City, Pa., U. S. A.

THE BESSEMER GAS ENGINE CO.



*If we're agoin' to prove we be growed up
'T want be by barkin' like a carrier pup.
But turnin' to an' makin' things ez good
Es wat we're allers bragin' that we could.*

—James Russell Lowell.

Our Factory Now—Over 370,000 Feet of Floor Space

GAS AND OIL ENGINES



E present here a few illustrations and brief descriptions of the various Oil Field Bessemer Design Specialties.

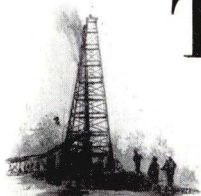
When using gas engines as power producers for oil well pumping careful comparison of the Bessemer with all other makes will save you money. The statement that "the gas engine has been the commercial salvation of the oil producer" is true. To produce oil at the lowest possible cost per barrel is good business. The up-to-date producer is cutting production expenses at every point. Oil Field Bessemer Design Specialties will help you do it.

Many very small wells in the various oil fields are being run at a profit with Bessemer Gas Engines and Bessemer Roller Pumping Powers as a motive power. If small wells thus equipped can be run at a profit, so also the larger wells. Every penny saved by modern methods helps to make dollars earned. Every cubic foot of gas now saved through the use of the gas engine as a prime mover extends to you nature's power fuel that much farther into the future.

The Bessemer is not the cheapest, neither is it the highest priced gas engine built. The mere cheapening of an engine with the primary object of lessening the first cost is not conducive to true economy or efficiency. The first cost of a high grade engine can oftentimes be saved by the low cost of replacements, whereas the repair bills of a cheaply built engine are perpetual. Our compact design, with few parts, and a complete, up-to-date, specially equipped factory, enable us to use the best material and build and sell a Strictly High Grade Engine at a right price. We know that the special points of excellence in design incorporated in the Bessemer will appeal to your best judgment as being founded on high class Gas Engineering principles.

So also the world famous Bessemer direct driven compressor; the Bessemer fuel oil engine; the improved S. G. Reverse clutch; and all other Bessemer products are the best that can be built.

The Bessemer Oil Field Engine



THE Bessemer Design Oil Field Engine is a decided departure from the lines usually followed by the various gas engine builders now doing business in the oil fields. Years of experience in the repairing and building of oil well machinery taught the builders of the Bessemer Design that the piece of machinery that will accomplish the same or better results with fewest parts will give the longest service and be much cheaper to keep in repair. This idea of few parts, and a determined purpose to do away with those parts which were the usual source of trouble, were the guiding thoughts in the building of the Bessemer.

How well we succeeded is testified to by thousands of well pleased owners, owners who will gladly tell you that they are securing a more continuous service at a much less cost in way of repairs from their Bessemer Gas Engines than from any other make of gas engine they are now using or have heretofore used. To get the best for the money paid is the natural desire of all.

Then examine carefully the general make-up of the various gas engines offered you, and note the decided difference in the Bessemer Design.

Many thousand dollars were spent in simplifying the Bessemer, and it stands today in its simplicity without a peer in the power field.

The Bessemer is a two-stroke cycle engine; that is, it receives a power impulse every revolution of the crank shaft. Many others receive but one impulse to every two revolutions of the crank shaft.

In looking over the various makes of gas engines, you will note in several designs the number of valves on the power end of the cylinder exposed to the force and heat of the burning gases. You will also note that these valves are controlled mechanically, opened and closed by some means with the turning of the crank shaft as the operating power. These features you will note are entirely absent on the Bessemer. No valves are exposed to the force and heat of the burning gases. No valves are controlled mechanically. The Bessemer has but one valve; it admits both gas and air. It is automatic in action, and is away from all force and heat of the burning gases. You will note the entire absence of moving parts on the Bessemer.

We consider, also, the cross-head a valuable feature in the make-up of the Bessemer Design. By its use the cross-head pin brasses are in plain sight, and are cool and can be easily adjusted. The cross-head also relieves the cylinder of the top and bottom wear, due to the up and down thrust of the connecting rod, which occurs in all gas engines which make a cross-head out of the piston head. The cross-head feature in the Bessemer Design adds much to the life of the cylinder.

The chain oiler on the crank bearings is an excellent addition in that there is no wasting of oil through the excessive dropping of sight feed oilers. Oil is delivered to the shaft automatically when the engine is running; any excess returns through proper channels to the oil reservoir beneath the crank bearings. Cross-head slides, cross-head and crank pins are lubricated by sight feed drop oilers or a force feed oiler as desired.

When the number of Bessemer Gas Engines in use in the United States oil fields is counted not by scores or hundreds, but by thousands, it is undoubted proof of Bessemer Betterness.

No such results could be achieved did the engine not have unusual merit.

Bessemer engines have proven a most profitable investment alike to the man with a few wells and the corporation with thousands of wells.

They get all of the production at a minimum of cost.

We have spent many years of close application to the building of the Bessemer Engine. We studied the requirements of the oil producer and designed the Bessemer Engine to meet them. The success of the Bessemer today is but the logical result of rightly directed effort and the expenditure of large sums of money in equipping a modern factory, so that the Bessemer Gas Engine, with all its superior features, might be sold at a price that would compare favorably with other types.

We are building the Bessemer Engine much heavier and stronger than necessary; we are using only the highest grade material we can secure; we are machining with the utmost care and precision on special machinery operated by skilled men, many of whom have been with us for years. Every part is machined to jigs, hence every part is duplicate. Assembling and testing is accomplished by trained mechanics.

The use of the cross-head, no valves exposed to the heat and force of exploding gases, automatic lubrication, whenever prac-

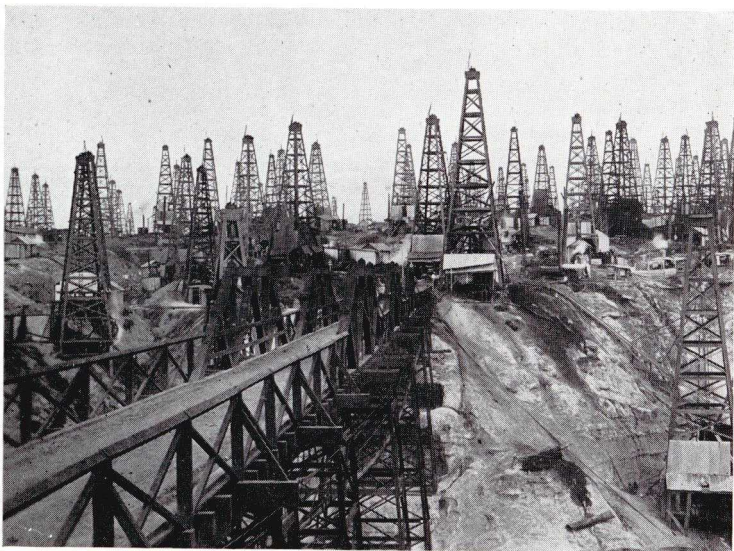
licable, and the completeness of each installation, have all made for Bessemer success.

The reliability of the Bessemer is unquestioned. A Bessemer installed on your lease is insurance against shutdowns and break-downs. Thousands of oil producers have found them to be most economical, from the fact that they are always ready to do their work in a satisfactory manner.

How many days lost production has a cheap, unreliable engine cost you? A day, a week's production lost to you on account of a cheap engine would more than pay the difference between the reliable Bessemer and the engine a little lower in first cost.

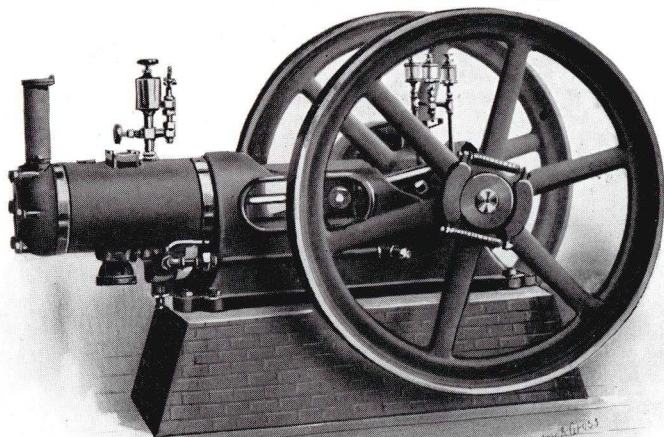
Gas engine building is our business—it is not a side line—our success has and does depend on our making good gas engines and pleasing our customers. We are specialists in our particular line and equipped for doing good work and financially responsible to fulfill any contract into which we might enter.

We equip with Reverse Clutches for pulling rods and tubing. Complete power plants installed.



OIL FIELD IN INDIA
Bessemer Machinery is used in this and Many Other Foreign Fields

The Bessemer Gas Engine



8 H. P. Bessemer

This cut illustrates the eight horse power Bessemer Gas Engine. All Bessemers in the horizontal design use a cross-head. The same excellent features found in the large horse power Bessemer Design are, in the main, made use of in the smaller horse powers. Bed Plate is semi-enclosed. Cross-head is bored and adjustable.

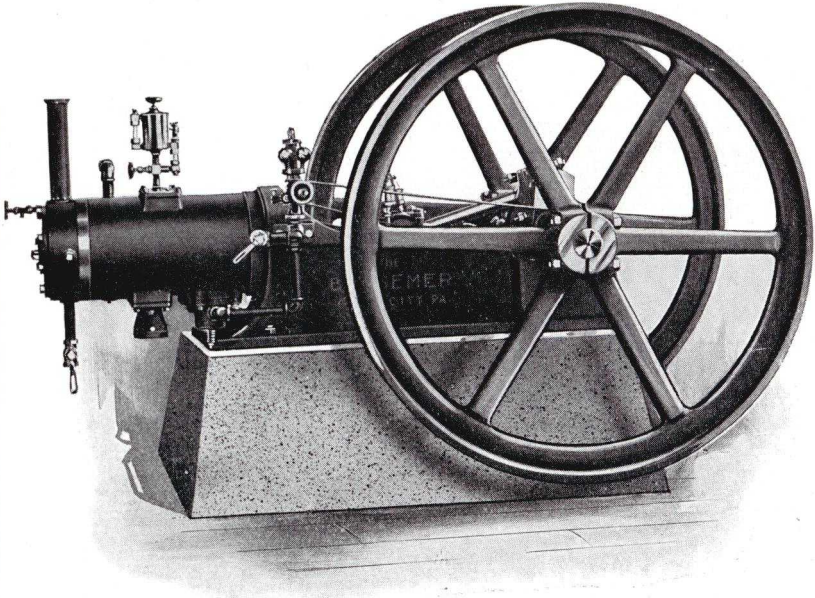
In building these small engines the same attention to detail, the same close inspection, the same high-grade materials and workmanship that has made the larger types of Bessemer Gas Engines the admiration of the power-using world, is used.

In machining all Bessemer parts, they are made duplicate by means of jigs. Our investment in jigs mounts into many thousands of dollars, but it is your assurance that should you ever need a part for the Bessemer it can be secured quickly, and you will have the satisfaction of knowing the new part will be an exact fit.

This type of Bessemer Engine, 8 H. P., is extensively used by butchers and bakers, by ice cream manufacturers and confectioners, by owners of private electric-lighting systems, for furnishing power for the auxiliary machinery in gasoline plants and the many uses to which such an engine can be placed.

It is an extra heavy, extra strong, comparatively slow-speed engine for those desiring a small engine de luxe.

The Bessemer Gas Engine



Style of the 10 and 12½ H. P. Bessemer Oil Field Engine

The 10 H. P. and 12½ H. P. Bessemer Gas Engine is of the open bed type with box cross-head. It is the handy size for the small power user, who will find it a faithful servant up to its capacity.

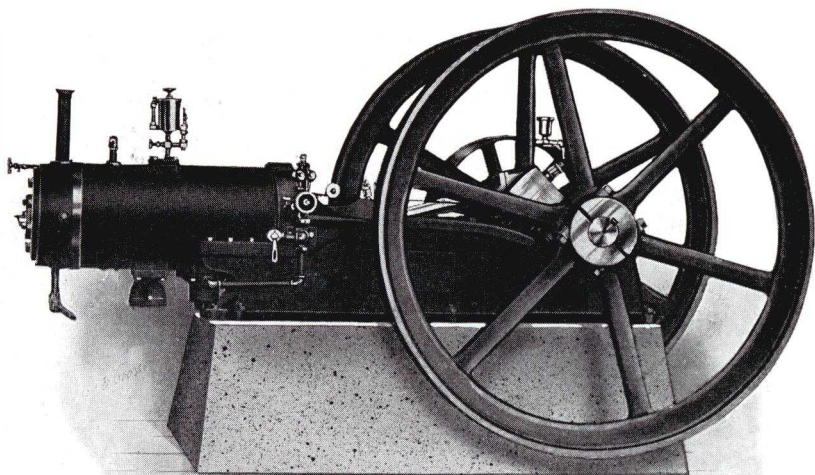
The universal need of a small horse power engine, reasonable in price, yet strongly built, for the pumping of individual wells or a set of wells with a power is filled by the Bessemer Design 10 and 12½ H. P. Engine.

There are numerous small leases, especially in the older Eastern fields, to which these engines are well adapted. They are also widely used in small machine shops and factories, feed mills, etc.

Equipped with electric ignition, when desired, at the additional price of the electrical equipment.

What is said in this catalogue, on the pages relating to the description of parts, refers to the 10 and 12½ H. P. as well as the larger sizes. The dimensions of the various parts are given on page 81.

The Bessemer Gas Engine



Style of 15 to 35 H. P. Oil Field Engine

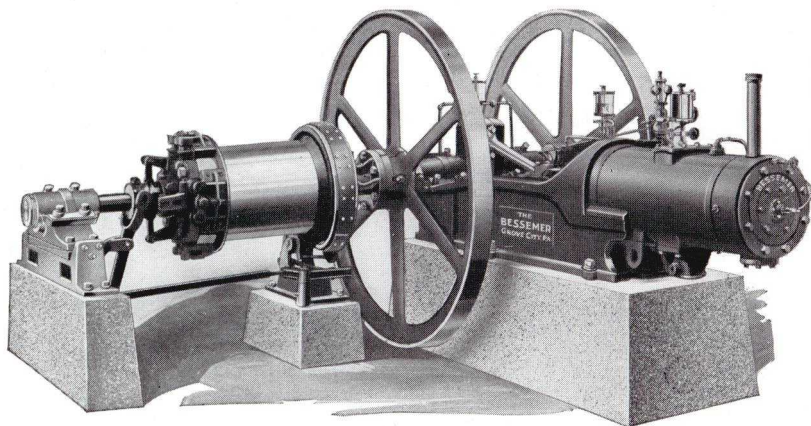
It is a well known fact that service in the oil field thoroughly tests the worth of any piece of machinery. The Bessemer Design Oil Field Engine has stood the "oil field test" for many years, and each year demonstrates its superior worth for oil well pumping or power operating.

The illustration shows the oil field type of engine, as built in sizes of 15, 20, 22½, 25, 25-30, 30 and 35 H. P., and it is these sizes that are ordinarily used in the oil fields, both on pumping powers and in the deep oil territory where reverse clutches are required.

The engine is fully described throughout this catalogue, and the pages devoted to the description of the engine as a whole and also the pages devoted to a description of the parts we ask you to read believing that it will prove to you what those who have purchased thousands of Bessemers know, *viz.*:

"You buy the BEST when you buy the BESSEMER"

Bessemer Reverse Clutch



Bessemer Oil Field Engine equipped with Bessemer Type SG Reverse Clutch

You can be ever so enthusiastic about some one of your products, some product of your best engineering brains, and yet fail in arousing the same enthusiasm in those who are to buy and use that same product. In many years manufacturing experience we have learned that it is "the oil field test" that proves the success of your new creation.

And now we are hearing from the oil field men and companies who took our word for it that the new Bessemer Type SG Reverse Clutch was a big improvement over anything offered for a similar purpose and they say we were right. Out into the fields they have gone by hundreds to be subjected to every severe test and have been making good consistently. We felt that they would prove popular with both owner and worker and now we know that they have received and will continue to receive the oil field stamp of approval.

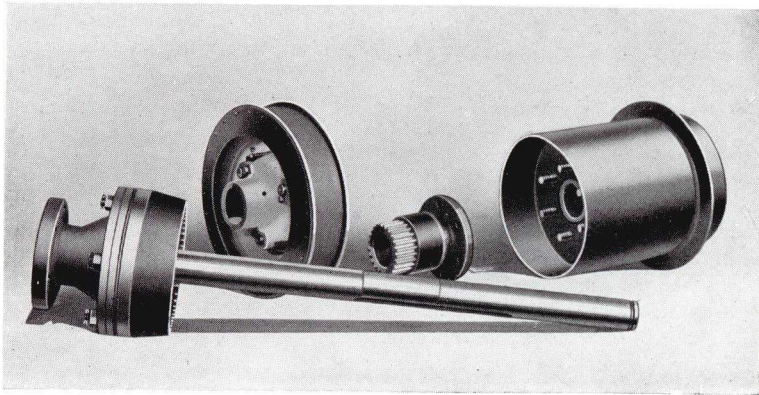
It is perhaps difficult to build any type of clutch, either straight-way or reversible, that is 100% perfect, but surely the Type SG Bessemer more nearly approaches this ideal than anything heretofore invented.

It is the result of much study, made not alone in an engineering department, but with the help of experienced oil field talent, all working to the same end—a better mechanism for drilling, cleaning out and pulling rods and tubing.

First—This Clutch has the normal engine speed forward, but on the reverse runs more than twice as fast as the engine speed. This additional reverse speed advantage lessens the time very materially in pulling rods and tubing, and at the same time is much easier on the engine, inasmuch as the engine does not have to run so fast as is usual when doing such work. The advantage thus gained by the use of such a clutch can hardly be over-estimated.

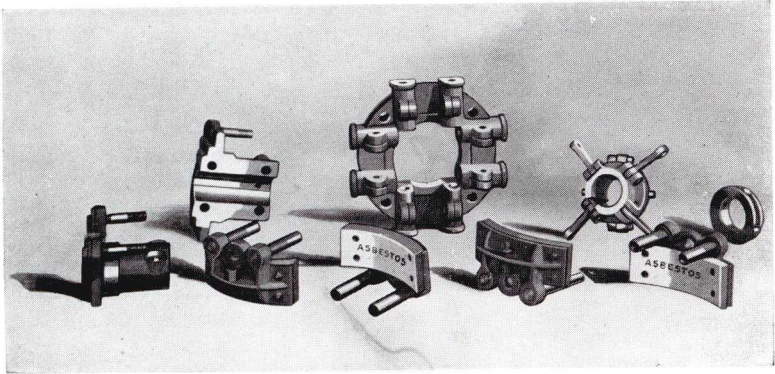
Second—The lubrication of reversible clutches has always been a very vital question with both manufacturer and operator. The Bessemer Type SG is so designed that the moving parts run in oil and so that any oil that finds its way out of the end of the bearings is caught and returned to the oil reservoir by centrifugal force. You may compare this system with the crank case of your auto. Every so often you drain out the old oil in your automobile and put in new oil. So with the Bessemer Type SG Clutch—it needs only to have fresh oil added periodically and between times it can be completely forgotten. We believe that this settles the oil question in a way that cannot help but meet the desired requirements and prove more nearly perfect than any other means.

Third—A feature that is of much importance to the operator who may at some time wish to take the clutch apart is that this clutch is designed with a split hub. In the past it has been customary, in order to insure that the hub stay fast to the shaft, that it has been keyed so tightly that to remove the hub in the field was quite difficult. The split hub for the forward drive of the clutch overcomes this objection. This hub is clamped on shaft over a key, and when completely assembled, we believe



A few unassembled parts of Spur Gear Clutch

it to be stronger than the solid hub. At the same time it allows for quick dismantling with no other tools than a wrench and hammer.



Forward Drive Friction Parts of Spur Gear Clutch, unassembled

Fourth—The use of asbestos composition friction shoes replaces the former wood and asbestos lined shoes—much more costly to manufacture but no additional cost to you.

Fifth—The gears are of steel and machine cut, insuring perfect fit and long wear.

Sixth—The flanged hub is cast of steel, which adds greatly to its strength. Instead of using the regular cold rolled steel from which the ordinary clutch shaft is made, we use a special alloy steel forged shaft. As a further caution to insure greater strength than actually needed, the shaft is heat treated and ground to size.

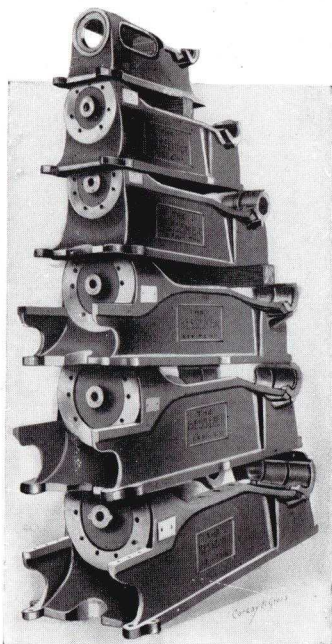
Seventh—Thoroughly tried and tested in actual oil field service and being specified and bought today in ever-increasing numbers.

Eighth—Bessemer built, with all the care and precision which that implies.

Ninth—Backed by Bessemer guarantees.

The Bessemer Reverse Clutch is a quality mechanism. In designing and building it we took no account of cost, but kept the idea of service, reliability and durability only in mind. The finished product that is the result of such methods has proven them wise. The Bessemer Reverse Clutch today stands without a rival in the three attributes which we always keep in mind—service, reliability and durability. At the same time, modern machine tools have enabled us to price this quality mechanism to compete with any clutch on the market.

The Bessemer Oil Field Engine Bed

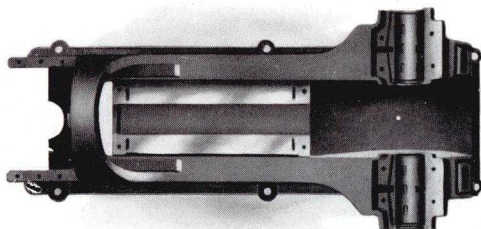


Stack of Oil Field Engine Beds

In Bessemer Engine Beds you will find that the perfect scientific distribution of the metal to meet the demands of the peculiar strain thrown upon gas engine beds is an accomplished fact. Being also thoroughly ribbed and braced, strength is further added, thus giving greater rigidity along with the symmetry always found in Bessemer Design goods.

You will note, too, that wings extend out from bedplate to act as cylinder support. Also the wide shaft bearings and the oil reservoirs beneath these bearings, enabling the shaft bearings to be lubricated by chain oilers.

The Crosshead Slides are accurately machined. They are then spotted with surface plate and hand scraped, giving a perfect bearing. The Crank Bearings are babbitted in a jig fixture, which is located from the Crosshead Slide Bearing—thus insuring perfect alignment.



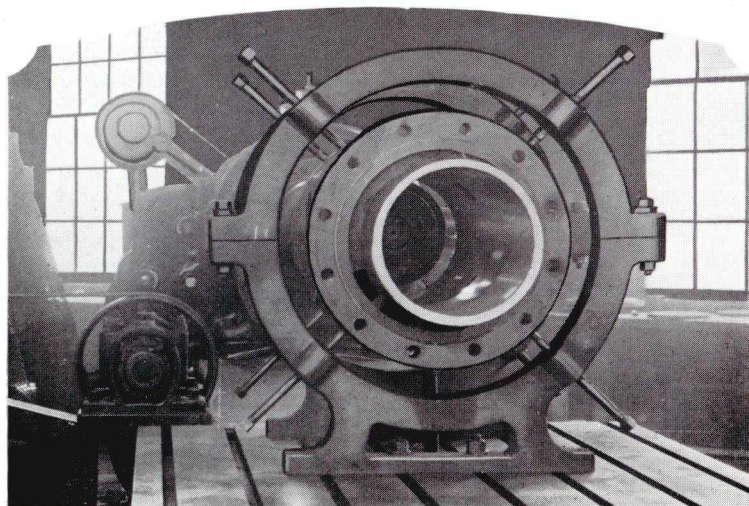
Top View of Oil Field Engine Bed

Bessemer Design Cylinders

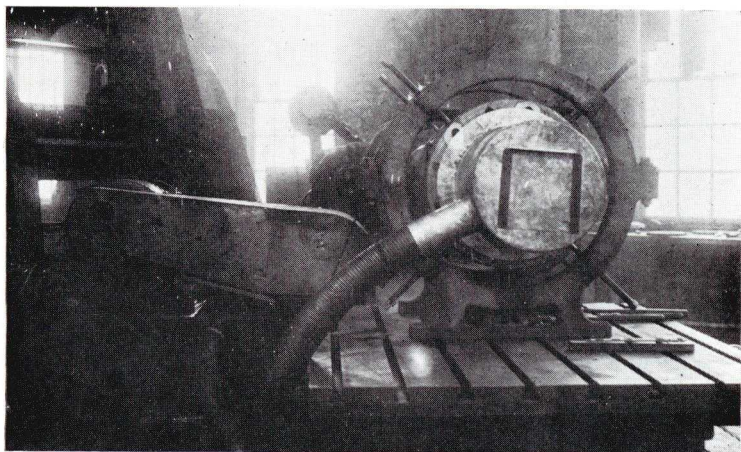


Possessing, as we do, our own foundry and our own complete metallurgical laboratory, we are enabled to closely guard against improper cylinder castings. The cylinders of Bessemer Engines are cast from a special formula, using close-grained gray iron, of a slow machining quality, to which is added a proportion of steel, which further fills the interstices and toughens the castings. The formula, grades of iron and process used in casting are almost identical with that used in making locomotive cylinders—the highest grade, highest priced steam cylinder castings made.

The cylinders are of great weight. In them you will find more than double the necessary computed strength. Every one is tested by hydraulic pressure and the scleroscope after machining



End view showing cylinder open and grinding wheel just starting in at far end



End View of Cylinder Grinder
Showing dust hood in place and connected to exhaust fan which
removes all grinding dust

and must show perfect before being passed into service. There are no offsets or projections in cylinder, hence no undue strain due to variable temperatures to which the cylinders are subjected. The inner wall of the cylinder is amply large enough to permit of two or three reborings if necessary.

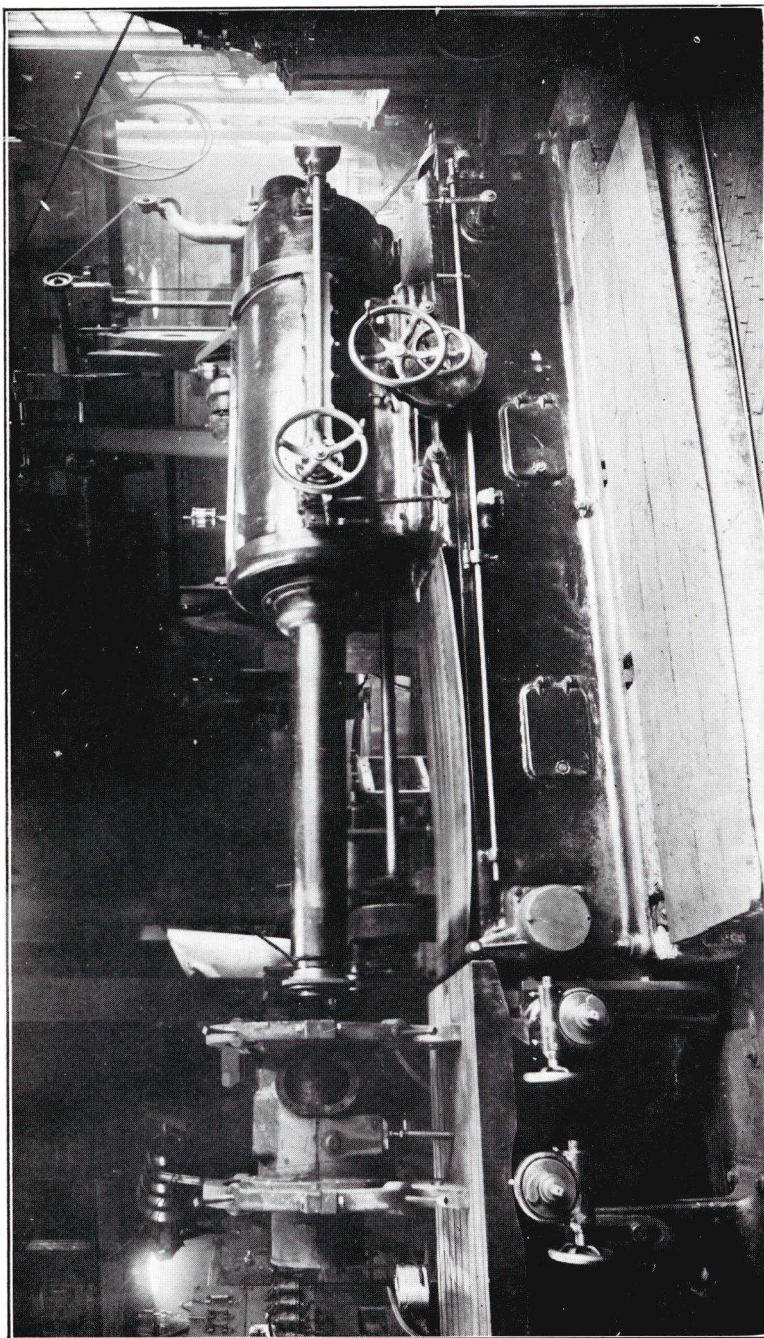
To make Bessemer engines and equipment the best, to protect our reputation of over 27 years, to guard your satisfaction through years of service, no detail of construction is hurried and no operation is skimped. New and special machinery is installed whenever the efficiency and durability of the finished product can be improved.

Illustrated above and on the following page is a huge machine used only for grinding the large cylinders that manufacturers ordinarily do not grind. Bessemer engineers, however, knowing that a cylinder to be perfect must be ground, installed this unusual machine, to procure which it was necessary to search Europe. The bore of Bessemer cylinders is now the same smooth perfect finish that you will find in your *automobile cylinders*. The ground cylinder proved such a big success in the larger sizes that we are now grinding all cylinders. To guard against a break-down of this grinder and thus be without its service, we have installed a second machine. There are therefore two of these cylinder grinders now being operated in the Bessemer shops. Cylinder is thoroughly water-jacketed.

Careful, conscientious work in buying, testing and assembling of material makes it so that—

"You buy the BEST when you buy the BESSEMER"

THE BESSEMER GAS ENGINE CO.



The big grinding machine that makes for better Cylinders on Bessemer Engines

GAS AND OIL ENGINES

Bessemer Design Piston Heads



From the "shortest" to the "tallest" the Bessemer Design Piston Head has in length a wearing surface exceeding the stroke of the engine. This long-wearing surface, with the absence of the up and down connecting rod thrust, so hard on the four-cycle cylinder and piston head, makes the Bessemer an engine which gives continuous service and has long life.

As in all other parts of the Bessemer Design Engine, special care is taken that in the casting of the piston head a fine, close-grained iron is used.

The finished surface is highly polished, and limit gauges are used to insure duplication. A reduction in size is made at power end which exactly conforms to the expansion of the material used due to the higher temperature at that point.

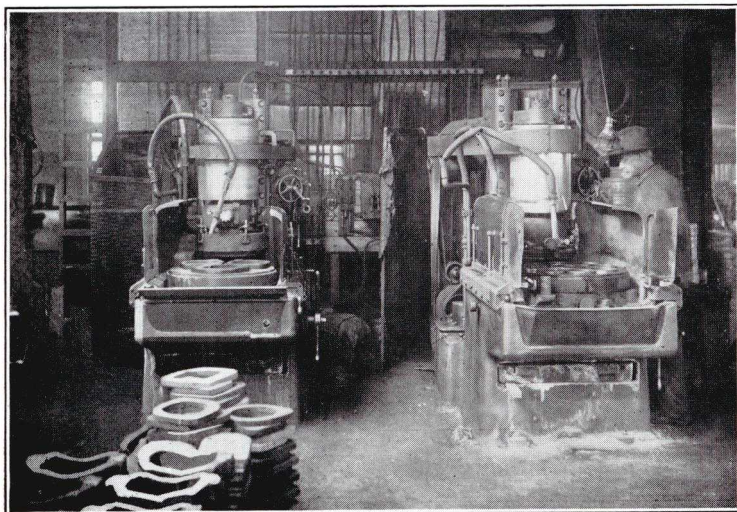
The life of Bessemer pistons, as stated above, is, like the life of Bessemer cylinders, very long. On account of our construction and the use of the cross-head, the piston bears on the cylinder with only its own weight. This is in direct contrast to the trunk piston of the four-stroke cycle engine, which bears on the cylinder not only with the piston's own weight, but also with the down thrust which is produced by the angularity of connecting rod on power stroke. You will understand the longer-wearing argument which we advance when we state that the amount of pressure per square inch of projected area will not exceed one and one-half pounds.

The piston is fitted with four compression rings in the rear and one single ring on opposite end. The four rings are pinned so that it is impossible for all joints to get in line.

Bessemer Piston Rings

All piston rings used in Bessemer Gas Engines, Oil Engines and Compressors are machine molded from the best quality close-grained gray iron. EACH RING IS AN INDIVIDUAL CASTING. By casting individual rings we are enabled to secure rings from 10 to 12 points harder and much closer grained than those turned and cut from the shell castings. The inside diameter is cast to size and only a grinding finish left on the inside. It is therefore important that the rings be cast by machinery, so that they come absolutely uniform as to size and shape. The object in not doing any machining on the inside of ring is to maintain the close hard scale which adds so much to its life, as the spring in the ring does not diminish by wear. This feature has long been recognized as the most important step in the production of a ring that has the life and spring most desired. To this end we have made it possible to mould these rings absolutely round.

The first operation on Bessemer rings is to grind the sides. This is done on a Blanchard magnetic chuck grinder. This machine has micrometer feed, so that the width is brought to within .0005-inch limit and with an absolutely perfect face.



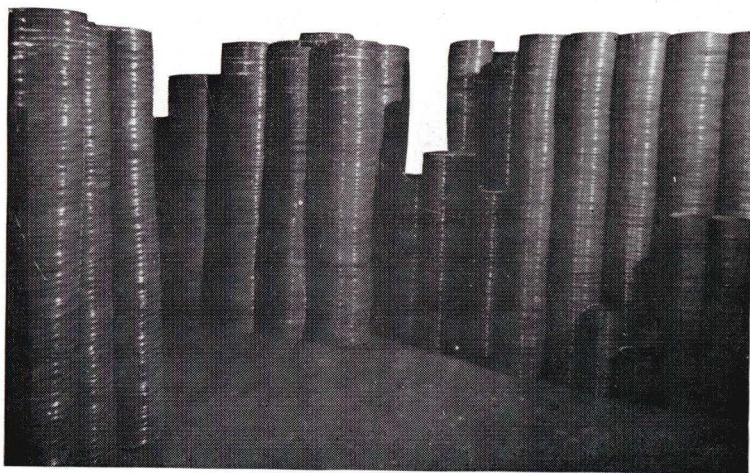
Blanchard Magnetic Chuck Grinders equipped with micrometer feed, which permits a perfect face to within .0005" limit

The following operation is a little unusual, this method having been used by us for a number of years and far surpasses any other arrangement we know of for producing a one-piece ring that will absolutely fit the cylinder wall perfectly and distribute equal pressure throughout its circumference. The fixture is an arbor which holds the rings in this closed position slightly eccentric to the arbor. This eccentricity has been determined by carefully testing the various amounts until we arrived at the point that took the abnormal excess pressure off the ends of the ring, but at the same time giving a pressure at ends equal to that at any other point in its circumference.

The finishing of the outside then is a very simple matter, as it is impossible to place the rings in the jig any other way than predetermined. So in all cases the eccentricity is the same on rings of similar size.

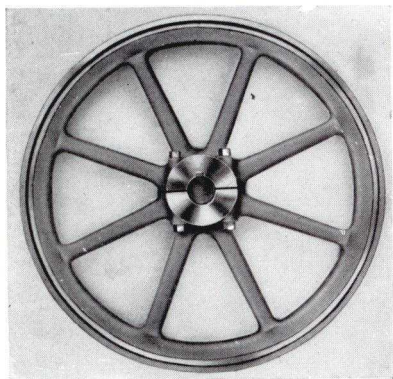
Of course, even after the unusual amount of care taken in this production, we do not stop at that. The rings have to pass a rigid inspection before being placed in stock.

The piston ring is only one of the many parts that has to undergo a like amount of prescribed law of production to make the name "Bessemer" famous.



Bessemer Piston Rings stacked for aging before being sent to the grinding machines

Bessemer Design Fly Wheels



Fly Wheel Showing Split Hub

An easily placed and readily removed fly wheel is very desirable. In the Bessemer Design fly wheel, you have those features. The split hub makes it so. Also allows for perfect rim contraction in cooling, thus giving a casting free from internal strain.

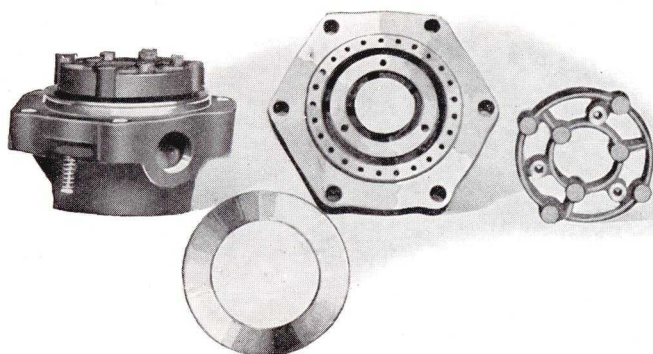
The fly wheels are proportioned properly as to size and weight, which insures steady power.

The bore of the hub is the exact diameter of the shaft, and with the key and the friction created by the four bolts, we have the ideal method for attaching the fly wheels.

The machining of the Bessemer Design fly wheel is done at one setting thus insuring perfectly true running when placed in service.



Air Valves



Air and Gas Valve

In the Bessemer Gas Engine there is but one air and gas valve body. The valve is of the disc type and valve action is vertical, so that gravity aids the springs in seating it. The advantage of the disc valve is in its extreme lightness, less lift required on account of there being an opening on inside of disc as well as on the outside. Less weight and less lift results in a much quicker acting valve, hence better efficiency. Both the gas and air are admitted to the mixing chamber through this valve.

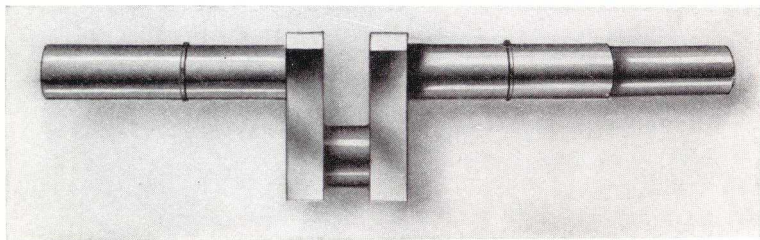
In engines up to and including 15 H. P. one disc only is used. In the larger engines the valve is composed of two discs. These discs are ground on a magnetic chuck grinder, which permits of a perfect face within .0005 of an inch. The discs are then ground to seat by hand, which insures a perfect joint.

The springs used are of the volute type, constructed of "ribbon" steel instead of the common practice of using round wire. LONGER LIFE and BETTER SERVICE are secured from this type of spring on account of complete action in every coil.

Another good point is that the Bessemer valve seat is perfectly flat, hence it always seats properly. As soon as any valve stem or guide becomes worn, a bevel seat valve is subject to unusual wear through failure to seat square.

Another feature which is of decided advantage is the incorporating of a butterfly valve in the air supply opening, which allows for adjusting the proportion of air and gas to suit the various conditions, thus increasing the thermal efficiency to a marked degree.

Bessemer Forged Crank



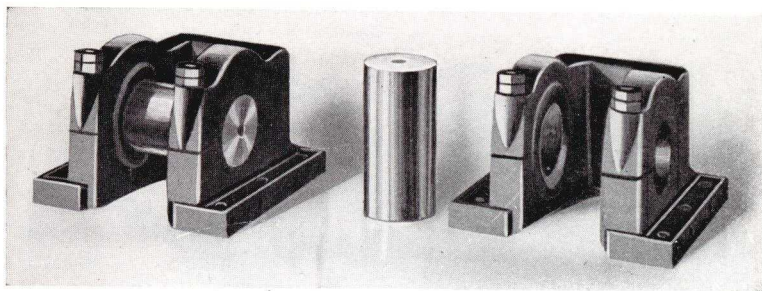
Single Throw Crank, Finished

BESSEMER Crank Shafts are forged from a solid billet of high grade 35 to 40 points carbon special crank shaft steel. They are rough turned and centers rough blocked, then *heat treated*. This process involves heating the shaft to a very high temperature and immersing it in a liquid solution for cooling. It is then heated to a slightly less amount and allowed to cool slowly. This process refines the steel and counteracts or relieves all internal strains. The shafts are then laid aside to season. After seasoning the crank is recentered and finished. While heat treating increases the cost, it adds fully 25% to their tensile strength and elastic limit. This is equivalent to making them at least a fourth larger than shafts not so treated.

Although this extra cost in having the crank shaft heat treated is borne by us, yet the user of Bessemers reaps the benefits—in that any shutdowns due to crankshaft breakages will be eliminated. We believe we are the only manufacturer of Gas and Oil Engines who heat treats every crankshaft that leaves the factory.

Limit gauges are used for all important measurements, making all shafts duplicate. There are no square corners or shoulders, but liberal fillets are allowed at points at which diameter changes.

Bessemer Design Cross-head

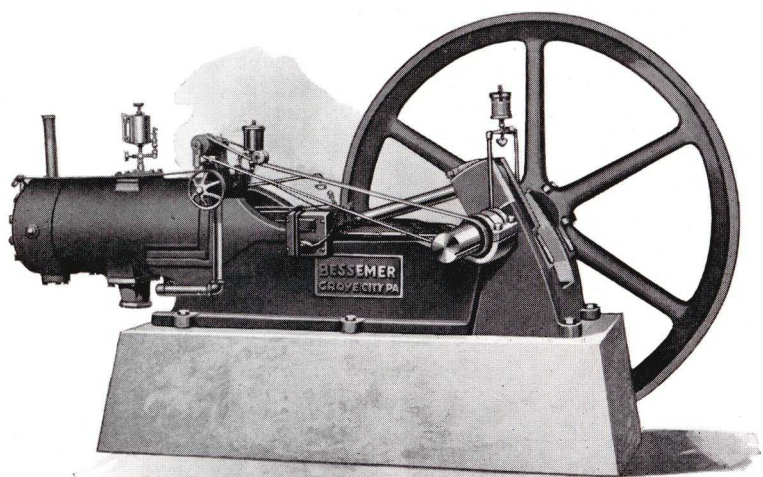


A Money Saver

Whatever makes for the bettering of the engine, or the convenience and profit of the user, the builders of the Bessemer Design make use of it. Not the least of the excellent features found in the Bessemer Gas Engine, is the Loose Pin Cross-head of the box type. The cross-head casting proper never wears out, it is always the wearing of the cross-head pin that causes the need of a new cross-head. In the Bessemer Design, the worn cross-head pin can be replaced in a few minutes' time, and at a fraction of the cost of a new cross-head. The Bessemer Design cross-head, with its removable pin feature, is a money saver. The illustration shows a Bessemer Design cross-head complete and also one with the pin removed. It will be noted that the cross-head pin is clamped and held firmly in place by the two stud bolts with double nuts at the front.

The cross-head feature of the Bessemer Engine is of extreme importance to you. It of necessity adds to the cost to us in building the engine, but we realize that it is too valuable a feature to omit in designing gas engines of any size above 12 or 15 H. P. The additional cost of the cross-head falls on us, not on the buyer. This feature is more fully covered elsewhere in the catalogue under the heading, "No Wear on Bessemer Cylinders."

Electric Ignition and Oil Field Governor



Showing High Tension Ignition and Oil Field Governor

Bessemer Oil Field Gas Engine Governor

An Oil Field Gas Engine Governor is a very important part of the engine's equipment. This is particularly true where the engine is started in the morning and given scarcely any attention by the operator during the day. Oftentimes the pumper is busy looking after other work on the lease and does not see the engine until evening.

Due to the possible variation of gas pressure in the feed lines it is vitally essential that the engine be equipped with the best governor it is possible to build. We believe this has been accomplished in the Bessemer governor, which is the product of many years experience in building oil field equipment. This

governor has been thoroughly tested and we are satisfied that it is meeting the most exacting needs of the oil country.

Following is a brief description of its operation:

The fuel control mechanism consists of the governor and fuel valve housing. The engine speed may either be under the control of the governor or under remote control. When the engine is under governor control the speed may be regulated while the engine is running by loosening the thumb screw holding the speed regulating bushing and turning the bushing to obtain the desired speed. By turning the bushing so as to draw it away from the bracket the speed will be reduced. If the engine is to be operated from a remote control the telegraph pulley is used. In this case remove the belt from the governor Pulley. The engine should now be made to run idle, while at the same time the throttle valve is entirely closed. This is accomplished by unscrewing the bypass valve until the engine idles satisfactorily. The speed and power is then controlled by the telegraph arrangement.

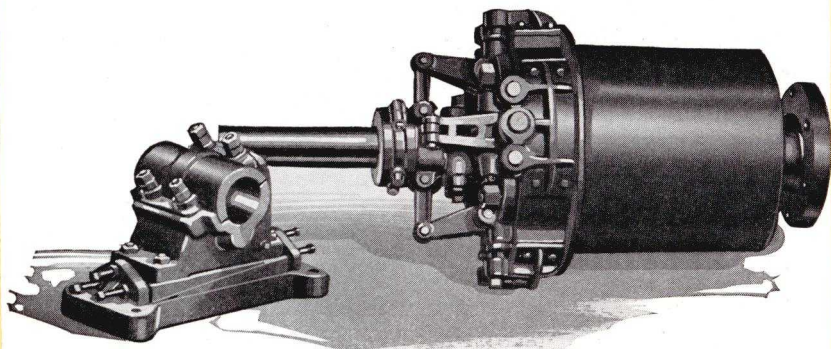
Electrical Ignition for Oil Field Engines

All Bessemer Oil Field Engines are so built that electrical ignition can be incorporated for the bare cost of the magneto and operating mechanism.

The accompanying illustration shows the magneto fastened by means of four cap screws to an overhanging bracket which in turn is attached to bedplate. The magneto is driven from the crankshaft by an eccentric which is coupled to the magneto by a connecting rod. This connecting rod is fitted with a turnbuckle so that the magneto can be quickly and easily set to fire at the proper point.

"You buy the BEST when you buy the BESSEMER"

Friction Clutches



18C-2 Clutch and Outboard Bearing

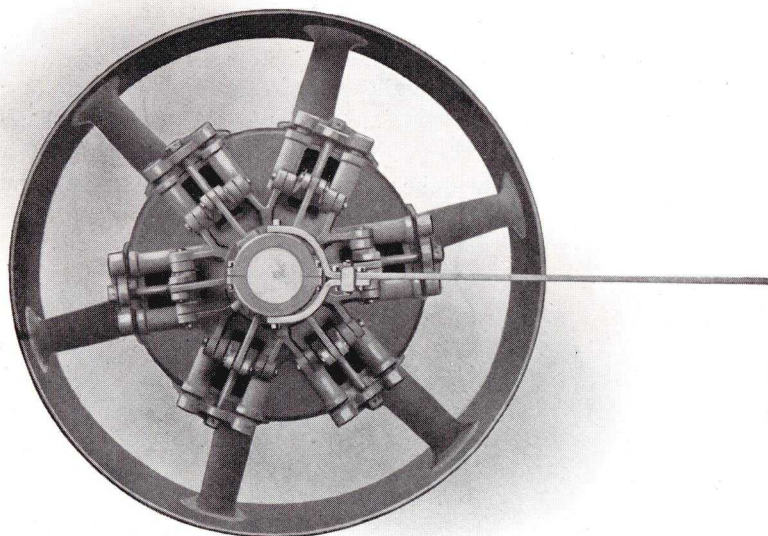
A good clutch is one of the most important parts of the equipment that goes with any engine. No expense has been spared in making this part of the Bessemer of the same high quality material and workmanship as the engine proper.

Above is shown the 18C—2 Clutch and outboard bearing.

The clutch is flanged so that it can be bolted to the fly wheel hub. It is provided with a split hub which is bolted and keyed to the clutch shaft. Solid asbestos composition shoes are used. A heavy shaft supports the clutch, the end of which is supported by the outboard bearing herein illustrated. Note that the bearing has a 30° split—so that the belt pull is taken entirely by the bottom or solid half—and is set on wedges for vertical adjustment. The outboard bearing also has set screws on each end for horizontal adjustment. This arrangement permits adjustment in any one of the four directions which allows perfect clutch alignment with the engine.

This same style clutch can also be furnished so as to be keyed on a shaft extension.

Outside Friction Lever Clutch



The six shoe clutch as illustrated above is usually furnished with the larger engines.

When Bessemer Engines are directly connected to machinery on which the load may be placed after the machinery is in operation, as an electric generator, it is customary to use a flexible coupling instead of a friction clutch, and when direct connected to pumps or line shafting a friction cut-off coupling is used. The Bessemer Cut-Off-Coupling is also of the outside friction type, similar to the friction clutch illustrated, except that no pulley is used.

Each clutch is tested before leaving our works. The mechanism you purchase from us will be right. It has been our aim to furnish the trade with a clutch that is superior to anything else that might be offered them, not alone in one, two or three points, but better in every way.

We believe that we have succeeded from the fact that as far as our knowledge extends, the Bessemer has been the victor in every competitive test made.

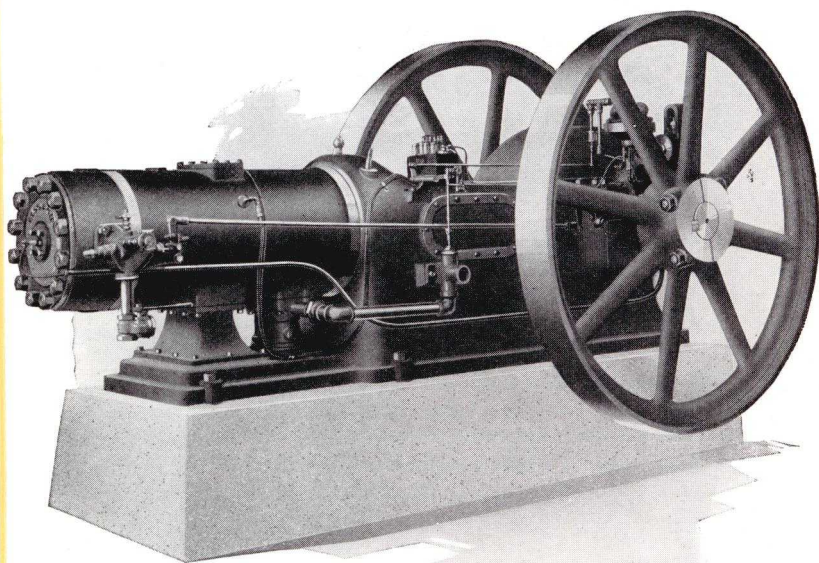
We solicit investigation and comparison with every other make offered you. We are anxious for any competitive test you care to make. It is in such investigations that the superiority of The Bessemer becomes apparent.

Commercial Bessemer Gas Engines

For the Oil Fields

For the leases of large production, many companies and individual producers are buying the Commercial Type of Bessemer Gas Engines, the same type that we furnish for factories, mills and electric plants.

They are already quite largely used for operating band wheel powers, single or duplex gas pumps, belted compressors, etc.



Single Cylinder Enclosed Crank Case Bessemer Gas Engine

The enclosed case commercial type of Bessemer Gas Engine is an engine de-luxe—something finer and better than it is possible to secure elsewhere. It is designed from the foundation up as an enclosed case engine—an engine suited for the most exacting service.

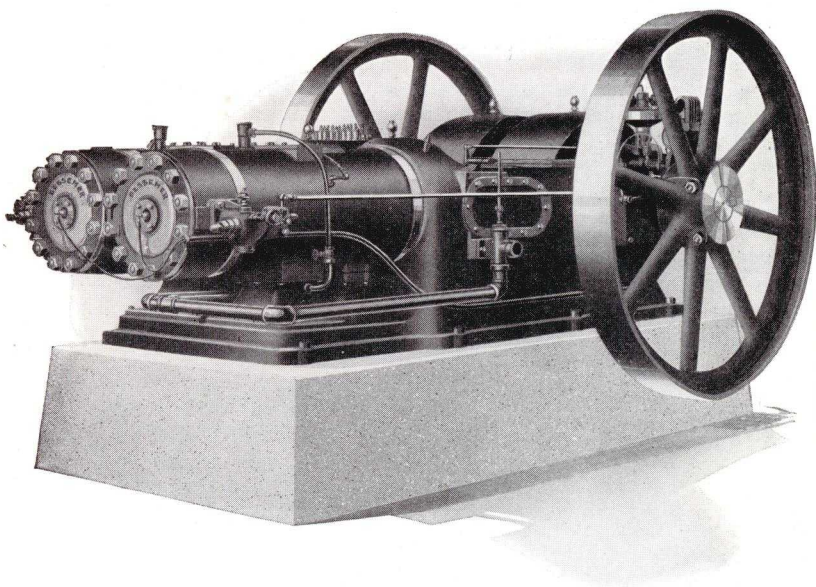
In size they are built from 15 H. P. to 165 H. P., but for operating band wheel powers, duplex gas pumps, etc., you will

be especially interested in the single cylinder 30-35 or 40 H. P. Enclosed Case Bessemer Engine illustrated.

Not all oil leases will warrant the installation of this type of engine with its many refinements, but many of them will justify such an installation and prove a profitable investment. This is especially true of the Mid-continent oil fields of the United States where production is large and where a day's lost production would mean no little financial loss.

What is said in this catalogue in relation to the cylinder, valve, crank shaft, piston head, and rings applies equally well to the enclosed crank case type of Bessemer Engine.

To treat briefly of some of the refinements we would ask your attention to the following:



Twin Cylinder Bessemer Gas Engine

Bed Plate

Is a heavy, massive casting, designed on scientific gas engine engineering lines, thoroughly braced at all required points. Extension of the bed acts as a support to the cylinder. Side plates and hood over crank shaft makes the bed entirely enclosed, which permits of splash lubrication, the crank, cross-head and bearings operating in a bath of oil. Removable plates give



Side View of Bed Plate for Single Cylinder E. C. Gas Engine

access to the bearings at all times for inspection and adjustment, but the lubrication is so thorough that it is seldom necessary to make adjustment for wear. Many of our engines have run for years without adjustment.

In many sections of the country where alkali water is prevalent the exhaust pipe and connections are attacked by the cooling water, which necessitates the repeated replacements of the pipe and connections.

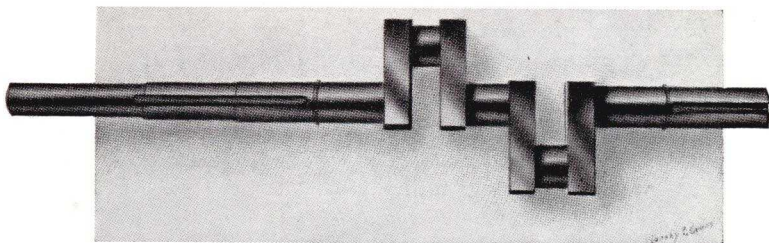
It has therefore been found desirable and convenient for the operator that the front end of the bed be cut out, as may be noticed in the above cut. This permits of easy access, which enables the operator to readily and quickly slide out an entire section of exhaust pipe without removing the exhaust flange connections.

Adjustable Exhaust Stool

In order that a better and more accurate connection for the exhaust might be possible, our engineers have designed a new exhaust flange which is known as *ADJUSTABLE EXHAUST STOOL*. This stool is composed of three main members, all of cast iron. The exhaust flange proper is bolted to the power cylinder. Jack bolts, which are held in place by the exhaust flange, take care of the cylinder weight.

The flanged exhaust coupling is bolted to the exhaust flange proper and the 45° discharge or exhaust ell is in turn bolted to the flanged exhaust coupling. The pipe connection to the exhaust ell is of the screw type.

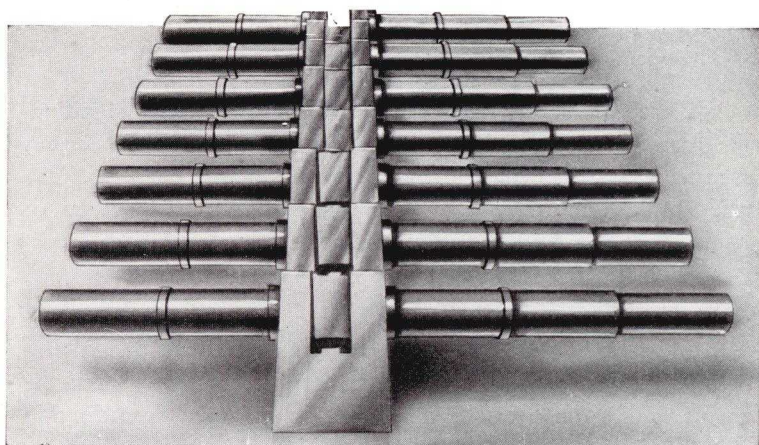
The joints of all members are provided with suitable gaskets and flanges. The joints are provided with slots, so that the machine bolts which are used to bolt the exhaust members together can be easily removed with the aid of a cold chisel and hammer, it being found from experience that the use of water in the exhaust coupled with the heat from same tends to make the use of cap screws or studs prohibitive.



Double Throw Crank Shaft, Finished
Used in Bessemer Twin Cylinder Gas Engines

Bessemer Crankshafts are forged from a solid billet of high grade 35 to 40 points carbon open hearth steel and heat treated after forging. The description of Crankshafts on page 22 is also applicable to the Bessemer Enclosed Case Crankshaft.

The Bessemer Design Twin Cylinder Shaft has the crank pins 180° apart. Two impulses every revolution with a perfect balancing of the engine is thus obtained. We invite your comparison of the perfect balancing obtained in the Bessemer Twin Cylinder Engine with that of other makes.



Rough Turned Forgings From Which Finished Shafts are Made

Crank Pin Bearings

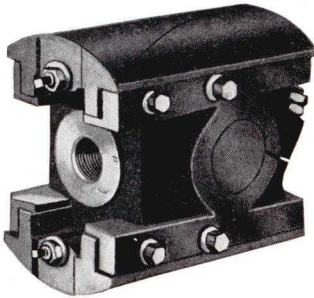
The crank pin bearings are of bronze, white metal lined, carefully machined on special jigs and scraped to fit.

Both crank pin and cross-head wrist pin bearings are held in their position by bolts of chrome nickel steel—the strongest known available metal, heat treated, ground to size on diameter and all threads accurately milled.

Connecting Rod

The connecting rod, marine type, is forged from thirty carbon open-hearth steel and finished all over. It is designed to be absolutely safe against any possible load to be transferred through it.

Cross-Head



Is cast of malleable iron and fitted with case hardened and ground steel wrist pin. This wrist pin is removable, should any undue wear fall upon it. Cross-head is fitted, top and bottom, with phosphor bronze shoes, set for a four-degree taper, permitting of adjustment for wear for many years.

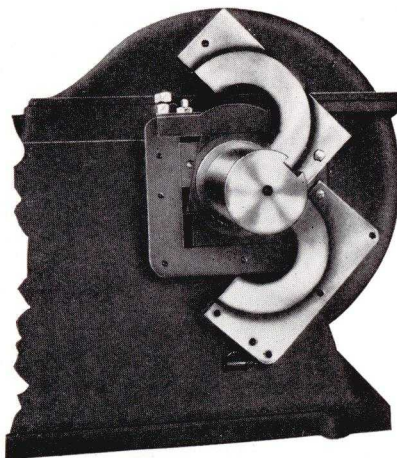
Ignition

These engines are all equipped with full electric ignition. We use a built-in, high-tension magneto which affords current even when starting, thus obviating the use of any batteries. The magneto is gear-driven from the crank shaft. This system of jump spark is now universally used on all Enclosed Case Bessemer Engines.

Governor

Governing is accomplished by means of a gear-driven centrifugal governor, located on shaft cap immediately over the crank shaft. The proportion of fuel is governed according to load. The governor is extremely sensitive, showing little variation from full load to no load.

Main Journal Bearings

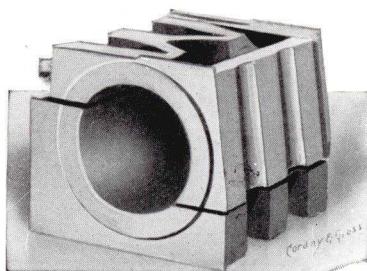


Oil Flanges on Bearings, Thrown Back

The bearing shell has cast in it a number of dovetailed anchor holes. These have been designed so that as to hold the babbitt firmly in place. The bearing shells are first milled on the outside and bored. They are then heated to a very high temperature so as to be of the same temperature as the babbitt metal when poured. Thus when cooling, the babbitt will not pull away from the bearing shell. The bearings are then

bored to the exact size of the shaft and faced.

Only the best babbitt that can be procured for this service is used. Great care is used and every precaution taken to insure the best bearing it is possible to produce for this class of continuous heavy duty work.



Upper and Lower Half Adjustable Crank Bearing

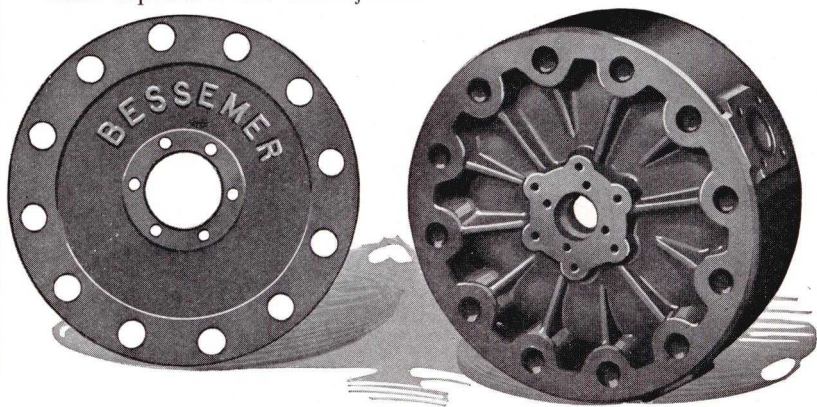
Air and Gas Valve

The mixing valve is of the leaf construction, the leaves working on the hinge principle, all leaves being thereby tied together and operating as one valve. This prevents the possibility of one or more leaves sticking to the seat and thus cutting down the available area of the valve. In designing this valve the excess air and gas area were utilized, making it possible to cut the velocity of the gas and air to a minimum.

Cylinder Head

After a great many years tests with various designs of cylinder heads we finally evolved the head which has been used for the past few years. This is termed the "Clean out type" Cylinder Head. It is so designed that the interior of the water-jacket surface is entirely exposed to view when the plate is removed.

This feature is particularly desirable when clean, pure water is not obtainable. The cylinder head plate or cover is easily removed, which permits of cleaning out any sediment, scale, or other deposits in the water jacket.



Clean Out Type Cylinder Head with Plate Removed

Lubrication

Lubrication of cylinder is accomplished by means of a mechanical force feed lubricator, which insures the right quantity of oil at the proper place at the proper moment. It is equipped with sight feeds, a separate pump for each feed.

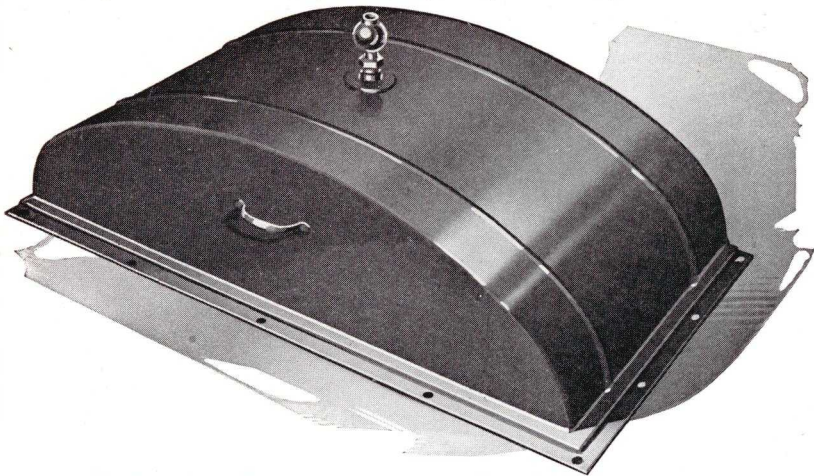
The main bearings, crank pin, cross-head and slides are lubricated by the splash system, the crank striking oil in crank case every revolution. All surplus oil from bearings drains back to bed plate. Oil rings on shaft keep oil from being carried out and side plates are provided to force the return of oil to bed. The front end of cylinder being of the closed type, with piston rod and stuffing box overcomes an objection to splash lubrication in the ordinary trunk piston gas engine. We, therefore, have all the advantages of this form of lubrication and none of the disadvantages. Dirt and dust are kept from bearings, no oil is splashed on floor. The inside of all bed plates is cleaned with acid and painted with special prepared white paint that oil will not attack.

On the single and twin-cylinder engines at the front end of the bed plate there is a hand hole plate. Integral with this plate is cast an oil receiving trough. This trough catches the oil which is carried up by the throws of the crankshaft, and it is returned to the crank case through a pipe line leading from this trough to the bottom of the crank case. A sight glass is incorporated in this pipe line. There will always be a stream of oil flowing through the sight glass as long as the oil level is of sufficient height so that the crank shaft throws will dip in it. Thus the operator can tell by watching the gauge glass whether or not the crank case contains sufficient oil.

The direct driven compressors use this same feature. However, in this case the pipe line leads from the crank hood, which has the oil trough incorporated therein to the sight glass, which is located on top of the cross-head guide. The oil is thus returned to the crank case in this way.

Bed Plate Hood

Instead of the heavy cast iron hood formerly used to enclose the crank case, we now use a steel hood. This new style hood is light in weight, which permits of easy handling and enables the operator to remove the hood quickly and easily.



In Bessemer Engines we have combined all that is desirable, nothing that is undesirable. All that is high grade, dependable and reliable and that makes for permanent, continuous, economical, satisfactory service. In these engines you secure quality, efficient lubrication, ease of starting, wide adjustment for wear and insurance that your lease is equipped to run every hour in the twenty-four, every day in the year.

Bessemer 45 H. P. Drilling Engine

It was perhaps 12 to 15 years ago that the first Bessemer Engines were used for drilling, and since then there has been an ever-increasing demand for them. All through the eastern fields may be found contractors and drilling crews who would tell you that they have used nothing else for a number of years. They have been shipped—not in any great numbers as compared with engines for pumping, but increased cost of fuel and, in some locations, bad water has tended to increase the demand.

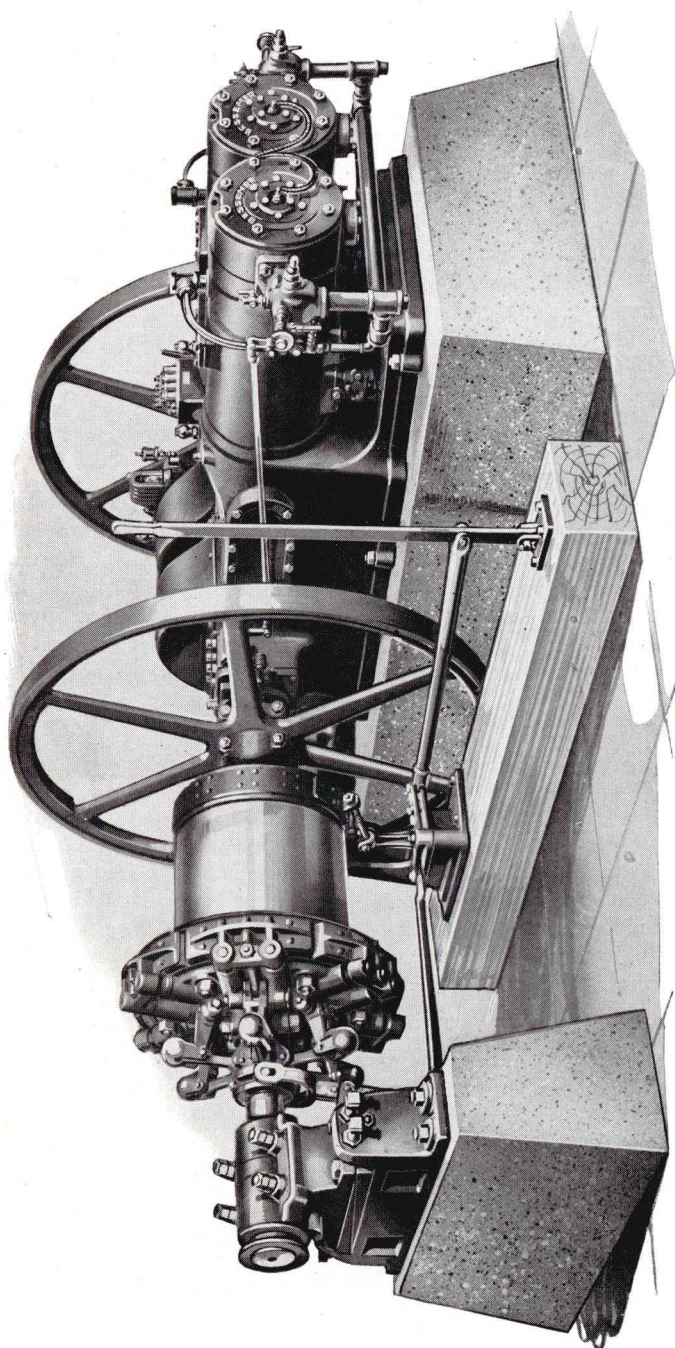
Some of the contractors used the regular oil field type of Bessemer Gas Engine, equipped with the special Bessemer Drilling Clutch, others used the enclosed or commercial type of Bessemer Gas Engine, and out of this wide experience and variety of types and sizes, we have evolved the Bessemer 45—a twin-cylinder gas engine that we believe meets the exact need.

If you operate in shallow territory a smaller engine will, of course, do the work. Regardless of the depth of the territory in which you are drilling we can supply an engine suitable to your needs. The Bessemer 45 is familiar to all workers in the oil country for the reason that it is similar to the Bessemer Twin Cylinder Commercial Gas Engine so widely used. Thus there is nothing new to be learned by the men in the field. Due to the speed sometimes attained by a drilling engine, cast steel flywheels are used instead of cast iron, thus increasing the safety factor.

The economy in drilling with the Bessemer 45 is so pronounced that from this point of view no argument is possible. The Bessemer will likely consume but 20% of the gas used when burned under a boiler. Thus, if you must purchase gas or have a market for the unburned gas, this four-fifth saving is most important. Further economy is accomplished in the use of water, and this in some fields is almost as costly as the fuel. With the Bessemer 45 you save practically all the water that the boiler would require to produce steam. The evaporation loss is the only loss when drilling with the Bessemer.

Another economy is in the time saved by the drilling crew. No more trips to the boiler. No standby while getting up steam at beginning of the well, and after the Sunday shutdowns, where such are observed.

The enclosed crank case with splash lubrication avoids the oiling time required when steam engine is the motive power. The



The Bessemer 45 H. P. Twin Cylinder Drilling Engine

necessity of setting the boiler back when oil or gas is found in large quantities is not present when the Bessemer is used.

The time required for drilling with the Bessemer is always as good as the steam method, and often somewhat shorter. The men operating Bessemers will tell you they can see little difference between the two forms of drilling as far as the handling of the tools is concerned. In using Bessemers a picked crew is not necessary, the regular crews always being used. Many of these men were not entirely familiar with gas engines. Although they had followed the drilling game from New York to the Western Coast and back, they had always used steam before the Bessemer was installed. At no time did they object to its use, at no time was engine or clutch trouble present, and the wells were completed in the usual required time.

THE CLUTCH—The special drilling clutch furnished with the Bessemer Gas Engine when used for drilling is a comparatively noiseless mechanism due to the well-fitted machine cut steel gears used. Its smooth-running is the admiration of those who use it. It is a distinct advance in clutch building. Six friction shoes instead of the usual four are used. The shoes are made of a heat-resisting, asbestos composition. The clutch spider is of the split hub type, and can thus be easily removed to make any replacements that may be necessary. The bearings are all phosphor bronze bushed. All gears are of steel and machine cut. The gears and bearings are all enclosed in oil tight case, easily accessible. This permits packing in heavy oil and insures perfect lubrication. The outboard bearing is made with taper wedge adjustment so the shaft can always be kept in line. It is also provided with automatic oiling. From first to last, the parts of this clutch are made extra heavy, accurately machined, perfectly fitted and well lubricated. It easily stands the hard service required of a successful drilling engine.

As stated above, the Bessemer 45 is substantially the same as the enclosed crank case type of commercial Bessemer Gas Engine. It has been tested by years. There are thousands in use. It possesses the modern refinements you desire.

GROUND CYLINDERS—The cylinders are cast from special, close-grained cylinder iron, the formula being closely watched and followed. After the regular boring process the cylinders are ground, giving **AUTOMOBILE CYLINDER SMOOTHNESS** to the gas engine cylinders. Better compression,

easier starting, less wear. No "wearing in" in the field. We believe we are the only manufacturers of large engines placing this extra cost on our cylinders.

ENGINE BED—Reinforced at points subject to strain. Heavier than necessary. Entirely enclosed to permit of splash lubrication of crank, crosshead and their bearings. Readily accessible for adjustment.

FLYWHEELS—*Cast steel* instead of cast iron, to safely admit of high speed at times desired when pulling tools, running bailer, etc., meaning added safety to crew.

CRANK SHAFT—Forged steel of ample diameter and bearing surface. Large pins. Wide slabs. Heat treated as a further protection against breakage.

CROSSHEADS—Steel crosshead with tool-steel wrist pin, hardened and ground. Fitted top and bottom with phosphor bronze shoes with adjustment for wear.

PISTONS—Close grained, long wearing iron. Piston rings individually cast, ground side fit and careful machining.

CYLINDER HEADS—Cleanout type with removable plate that opens up entire water-jacket for removal of water deposits if any occur.

AIR STARTING APPARATUS—Included in price of the Bessemer 45 is an automatic air starter, less piping, that enables you to start the engine automatically. Smoothly and easily, without jar or shock, the engine gets under way without manual help beyond turning on the air. The outfit consists of 4" x 4" air compressor, 16" x 84" air tank, pressure gauge, globe valve and the automatic valve operation for admitting the compressed air to cylinder.

IGNITION—Jump spark, current furnished by high tension, built-in magneto.

LUBRICATION—Force feed lubrication of cylinders.

Splash lubrication of crank and cross-head and main bearings.

The assembled engine is carefully tested and comes to you ready to meet any exacting test that drilling may require.

Back of the engine is the Bessemer Service, represented by branch offices and service men throughout all active oil fields.

Ask us for special **BULLETIN ON BESSEMER DRILLING ENGINE.**

No Wear on Bessemer Cylinders

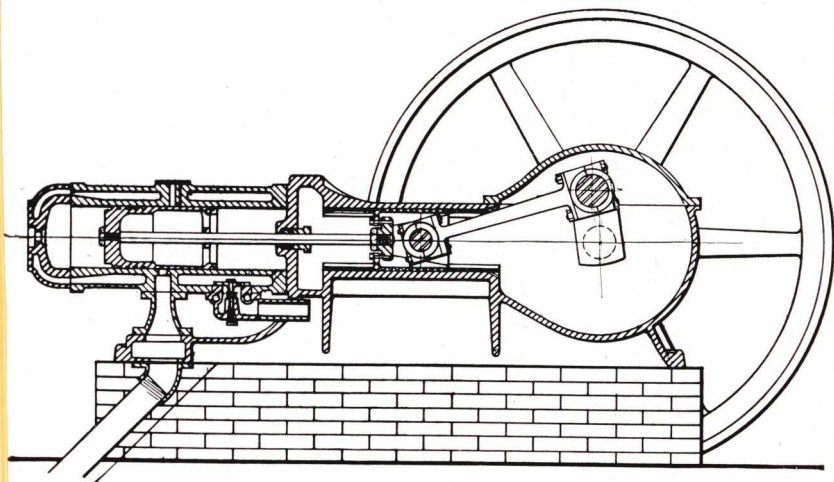


Illustration No. 1

A sectional View of the Bessemer Gas Engine showing the cross-head which takes the thrust of the connecting rod

As you are aware, Bessemer Horizontal Gas Engines are two-stroke cycle. As to appearance, the general outline of the Bessemer Engine is, you have noted, similar to the steam engine, but much heavier and stronger. A cross-head is placed between the crank shaft and piston head. By the use of the cross-head we have the wearing parts where they are always cool and can be readily reached and adjusted. Note Illustration No. 1. In direct contrast to this note the connecting rod bearing, piston end of the four-stroke cycle engine also shown in section in Illustration No. 2. This bearing is half way in the piston head and cylinder—surely difficult of access and adjustment, as you who have operated four-cycle engines know. Had the cross-head no other points in its favor this one would warrant its use.

But the main reason in using the cross-head in Bessemer Engines is to add to the life of the engine, and particularly the cylinder. This by removing from the piston head the angular

"You buy the BEST when you buy the BESSEMER"

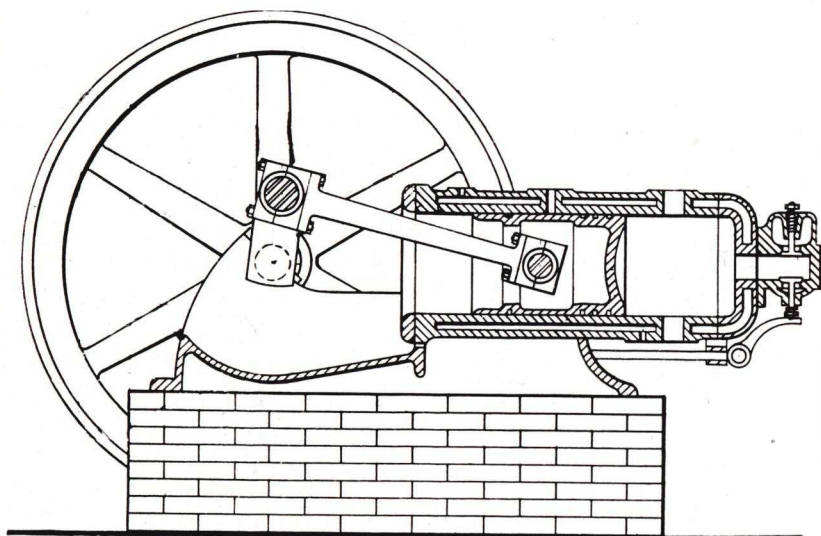


Illustration No. 2

A typical Four-Stroke Cycle sectional view showing the top and bottom cylinder wear in a horizontal engine caused by piston head connecting rod thrust

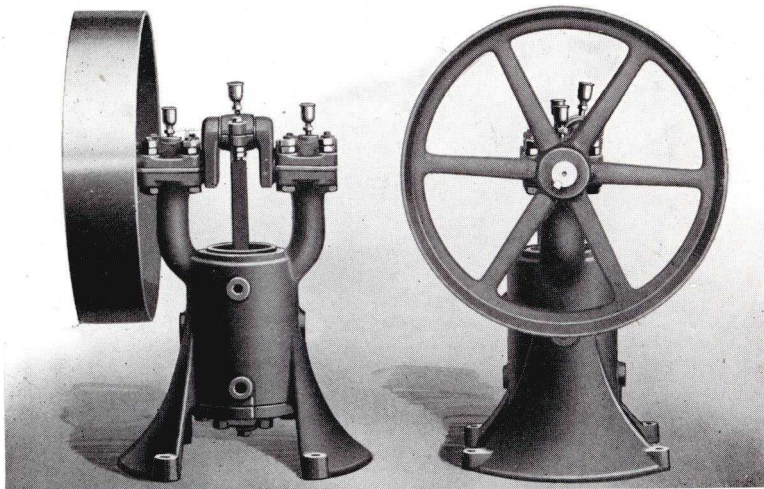
thrust of the connecting rod, with its tendency to wear the bottom and top of cylinders more than the sides and thus make the cylinder "out of round." By referring to Illustration No. 1 you will note that the cross-head is placed to take this thrust.

Then by reference to Illustration No. 2 we see a sectional view of an average four-stroke cycle horizontal engine, showing the common trunk piston used as a cross-head. This piston, unsupported, bears on the cylinder not alone with its own weight, but with the added up and down thrust of the connecting rod. It has not only to do the ordinary work of a piston, but also has to withstand the added thrust mentioned. This coming on the cylinder walls instead of on the cross-head, as in the Bessemer, can have but one effect, and that of wear.

Choose the horizontal Bessemer—the engine with the cross-head—and have this wear fall on an adjustable cross-head, not on an unadjustable cylinder. Think it over. Then act.

"You buy the BEST when you buy the BESSEMER"

Air Starting Apparatus



Bessemer Air Compressor for Starting Bessemer Engines

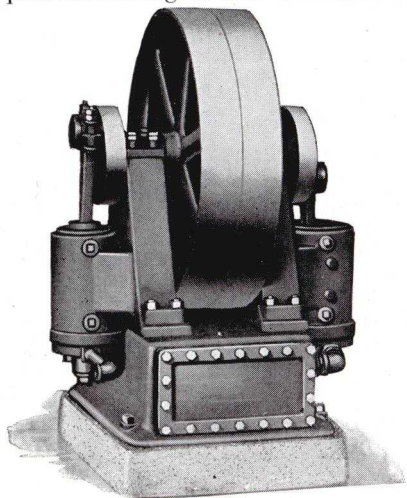
With Bessemer enclosed case engines of 35 H. P. and over our patented Automatic Air Starting device is furnished. This equipment is entirely in keeping with the high quality of the engine. It consists of a 4 x 4 vertical, single-acting air compressor with water-jacketed cylinder, an air tank tested to 200 pounds working pressure, quick-opening valve, air-tight globe valve and pressure gauge. This equipment is included in the price of the engine and forms a means for quick and easy starting.

The Bessemer

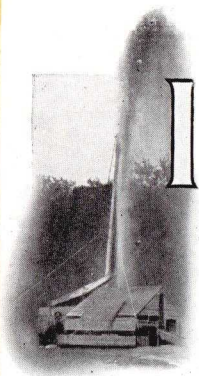
6 x 3 1/4 x 6 Two-Stage Compressor

A compact, single acting, vertical, two-stage air and gas Compressor capable of handling a volume of 20,000 cubic feet 0 to 250 lbs. each 24 hours. Diameter of tight and loose pulley 30". Floor space 30" x 31". Weight 1420 lbs.

A model Compressor for a gasoline testing plant or for compressing air for starting two or more large gas engines.



The Bessemer Roller Pump- ing Power



It is common knowledge that in the ordinary designed power, the keeping of the relation between the pinion gear and master gear constant is an impossibility. This difficulty is entirely overcome in the Bessemer Design. By referring to the Power illustration on page 46, you will note a turned runway on the circumference of the master wheel. You will also note the rollers, two being visible on the under side of the runway. Four rollers are spaced equally on the power base, and act as carriers for the master wheel. Also on top of the master wheel are two rollers, one being directly over the pinion gear, thus preventing the climbing of the master gear on the pinion gear, an act so common in the ordinary designed power. The above conditions, the four rollers on the under side and the two on the top, hold the master gear constantly in the same horizontal plane, binding on the center bearing is prevented, and the wear on it is the same, even though the load is all on one side of the power.

The Center Bearing has a removable sleeve, making it so that if it is ever desirable, the substituting of a new sleeve for the old makes the center bearing of the master gear practically new.

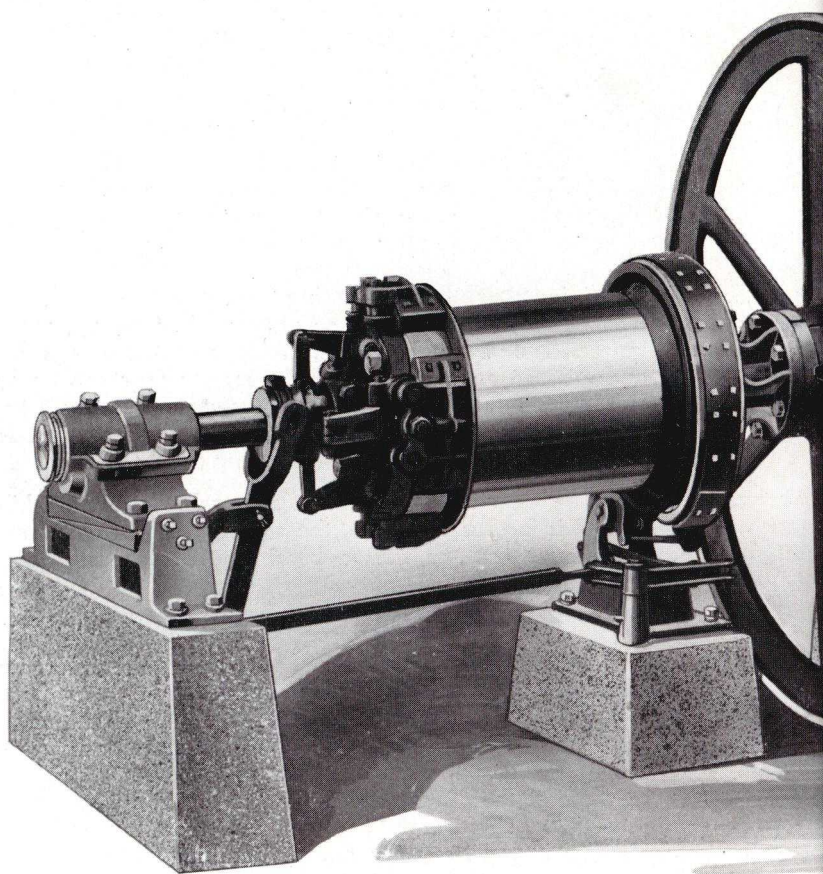
Another Excellent Feature

is the long pulley and pinion gear shaft. By referring to the illustration you will note the pinion gear is on the opposite side of the power from the pulley. This places the shaft bearings very wide apart, thus assuring perfect alignment, and a perfect meshing of the gears. You will note that the shaft passes through the base of the center bearing. The position of and manner of placing the shaft, along with the guide rolls and other excellent features in the Bessemer Design Pumping Power, are protected by patents, as also are many other of the Bessemer Design Specialties.

Steel Pinion Gear Runs in Oil

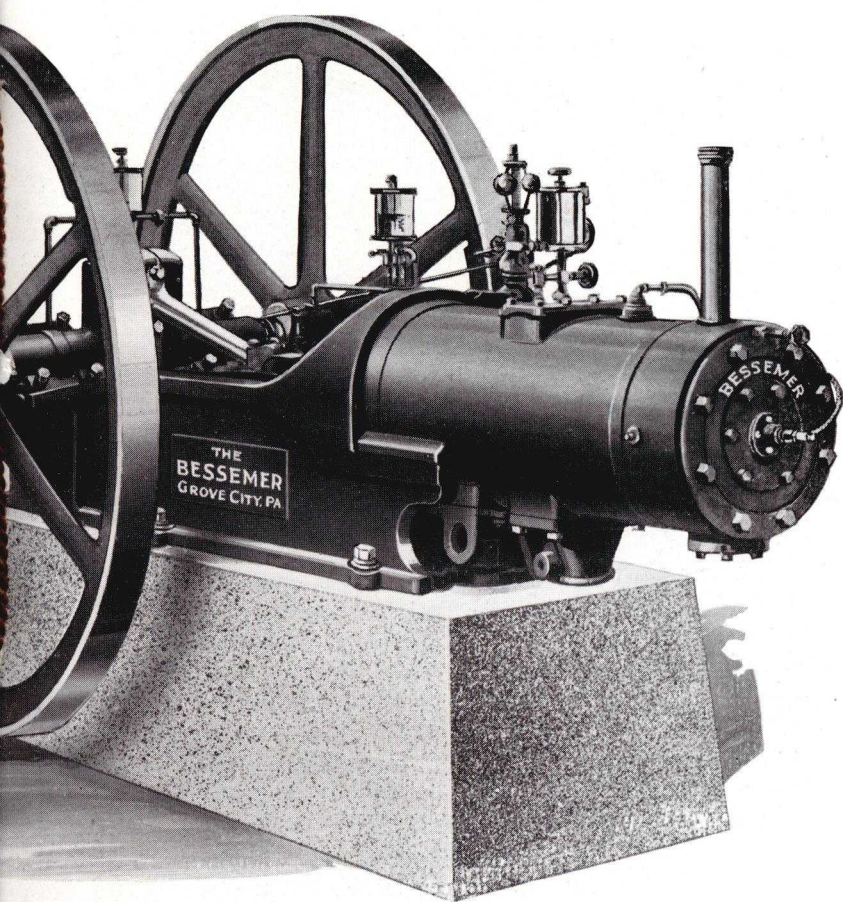
By comparison you will find the pinion gear on the Bessemer Design Powers made of steel and with teeth from 2 to 3 inches longer than on other makes of powers handling an equal number of wells. Extra long gear teeth, together with the fact

THE BESSEMER GAS ENGINE CO.



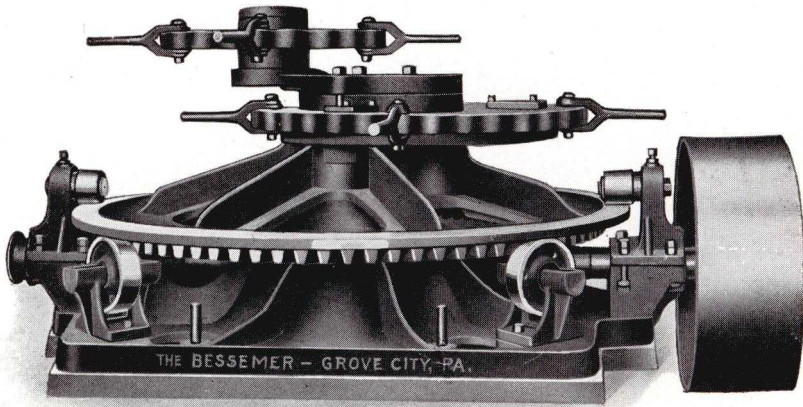
The Bessemer Oil Field Engine Equipment

GAS AND OIL ENGINES



with the Bessemer SG Reverse Clutch





Disc and Eccentric Type, Bessemer Roller Pumping Power

that the pinion gear is of steel and runs in oil, and that the pinion and master gear are constantly held in perfect mesh, insures easy running, and extra long wearing quality. Every other feature that makes for the bettering of the Bessemer Design Goods is made use of in their building.

Your Careful Consideration

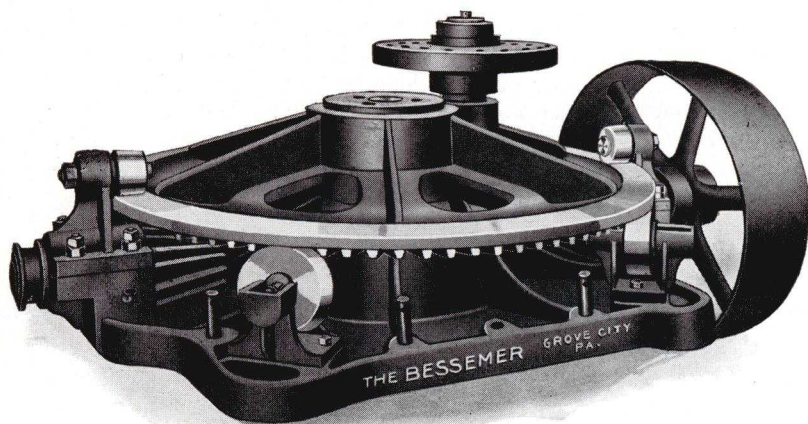
of the excellent features of the Bessemer Design Power is asked and we know that your good judgment will dictate the same decision as that of all those who have thus far used it or inspected it, viz:—"It is the best oil well pumping power we have ever had or seen."

In addition to the above excellent new features, the great strength and compactness in design appeal strongly to the power users. The low down feature is also a strong point.

The constant, even running of the master wheel, with its consequent freedom from "bind" in the center bearing, makes the Bessemer Roller Pumping Power very easily operated, requiring, compared with other makes, from one to five horse power less to accomplish equal results.

If you are in need of supplies for oil well pumping, you make money BY SAVING IT when you buy Bessemer Design Gas Engines and Pumping Powers.

The Bessemer Roller Oil Well Pumping Powers



Single Disc Bessemer Roller Pumping Power

Specifications

No.	Base	Diameter Center Bearing Inches	Master Gear Inches	Gear Ratio	Gear Shaft Inches	Height to Rod Attachment Inches	Foundation Bolts and Size Inches	Standard Pulley Inches
1	3' 4" x 4' 0"	8½	44½	6 to 1	3	23	4 Bolts 1 x 36	24 x 12
2	4' 0" x 4' 5"	9½	54	6 to 1	3¼	25	6 Bolts 1¼ x 36	26 x 12
3	4' 6" x 5' 10"	10½	64	7 to 1	3½	28	6 Bolts 1¾ x 48	30 x 12

"You buy the BEST when you buy the BESSEMER"

Sizes We Build

The Bessemer Design Roller Pumping Power is built for handling eight, twelve and twenty wells respectively. It is offered to the power user as a thoroughly tested article. The many new features have each been "tried out" in hard service. The same excellent points are carried throughout in all sizes.

In stating that the powers are designed to handle eight, twelve and twenty wells, we do so mainly to show the difference in sizes. The number of wells handled must necessarily depend on the depth of the wells, the manner in which they may be balanced and the length of the rod lines. Sixteen wells might make a load for a twenty well power on some leases, on others they have pumped fifty wells.

In Stock

It is our endeavor to carry all sizes in stock at the home factory, and at our various warehouses and branches. They can also be had through the majority of dealers in oil well supplies.

The Bessemer Pumping-Jack

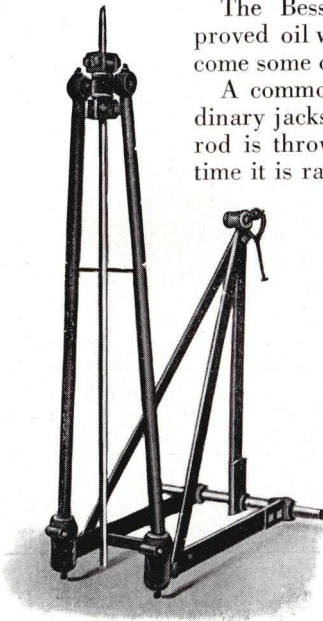
The Bessemer Pumping Jack is an improved oil well pumping jack designed to overcome some of the objections to the older jacks.

A common source of annoyance in the ordinary jacks is the manner in which the polish rod is thrown out of the perpendicular each time it is raised and lowered. This caused the

stuffing box to wear with a consequent leakage of oil and necessitated frequent repacking. The Bessemer Pumping Jack is so constructed that the jack straddles the casing head and a straight up-lift is given the polish rod. Thus there is no undue wear on either stuffing box or packing.

The Bessemer Pumping Jack is constructed of steel and wrought iron and is built extra heavy and strong.

The price is low and its many advantages have caused many oil producers to adopt them exclusively.



Bessemer Pumping Jack

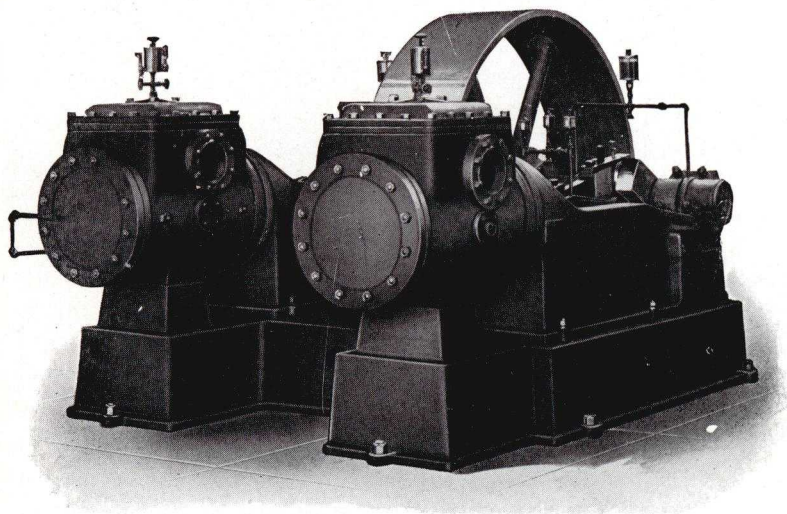
Bessemer Gas or Vacuum Pumps

The application of vacuum to some certain oil sands has increased their productiveness to a marked degree. Their installation has proven to be a most excellent investment for the oil producer, and their first cost is rapidly returned by the increased credit balance at the purchasing agencies.

Not only is the oil production increased, but the quality of the gas as far as it relates to gasoline content is greatly enriched, and thus the amount extracted grows in proportion. The most successful gasoline plants are located in territory on which gas pumps are used.

If gas pumps are placed on adjoining leases, then installation on your leases become necessary as a protective measure. Bessemer Gas or Vacuum Pumps are better designed, better built, better tested. They are built with the realization of the work they are to accomplish—the creation of a vacuum; and hence the machine work, the fitting and the testing are all done with that end in view. The result is a finished product that is efficient, reliable and dependable.

Bessemer Gas Pumps are built single cylinder and double cylinder or duplex types as illustrated, in 14-inch, 16-inch and



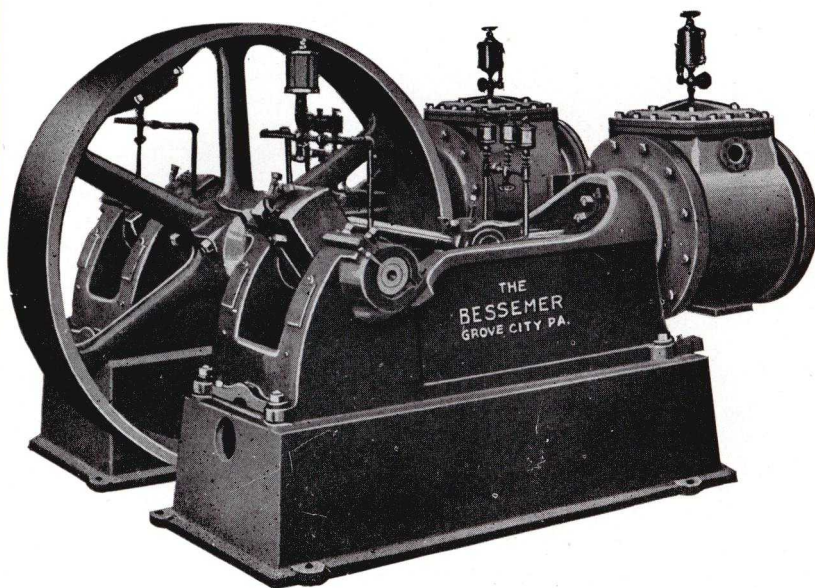
16-inch Stroke Bessemer Duplex Gas Pump

18-inch cylinder diameters and 12-inch and 16-inch strokes. The 12-inch stroke sizes are also built to attach to steam engine bedplates after the steam cylinders have been removed. This latter method makes a very cheap outfit.

The pumps we recommend are our complete pumps—attaching the cylinders to our regular gas engine bedplates. This makes a very heavy, strong installation. The nature of the work is such that reliability is of the utmost importance, for a shut-down or breakdown means that the vacuum may be lost and it may take days to recover it. Bessemer Gas Pumps driven by Bessemer Gas Engines installed on your leases is insurance that your plants will be reliable—will operate continuously.

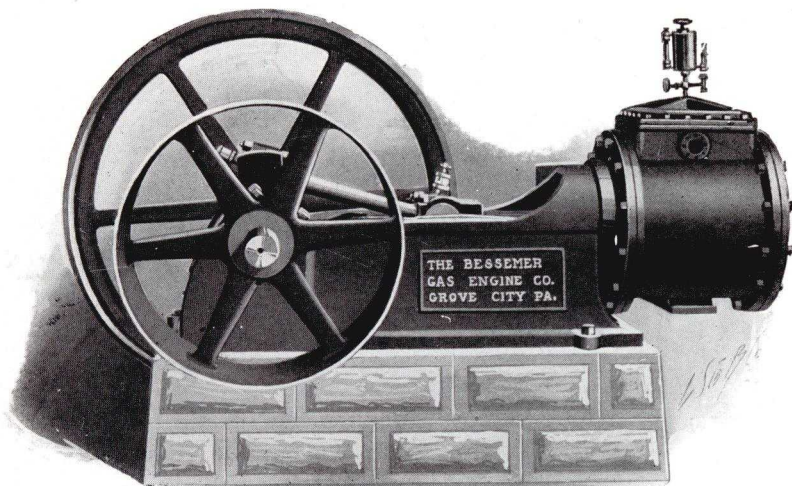
Water Jacketed Vacuum Pumps

When gas pumps were first marketed no great pressure was desired on the discharge side, hence no great heat was created, and to save cost, water-jackets were omitted. Subsequently a need has arisen for higher discharge pressures, and to meet this demand we have designed and built water-jacketed cylinders. Thus any heat that is created is absorbed and carried away in the jacket water.



Double Cylinder Bessemer Gas Pump

An improved disc valve now used on Bessemer Vacuum Pumps permits of a speed up to 225 R. P. M. if it is desired and adds to the efficiency of the pump.



Single Cylinder Bessemer Gas Pump

Many hundreds of these pumps are in use throughout the oil fields where a vacuum is maintained and all the more prominent oil companies are regularly sending us repeat orders.

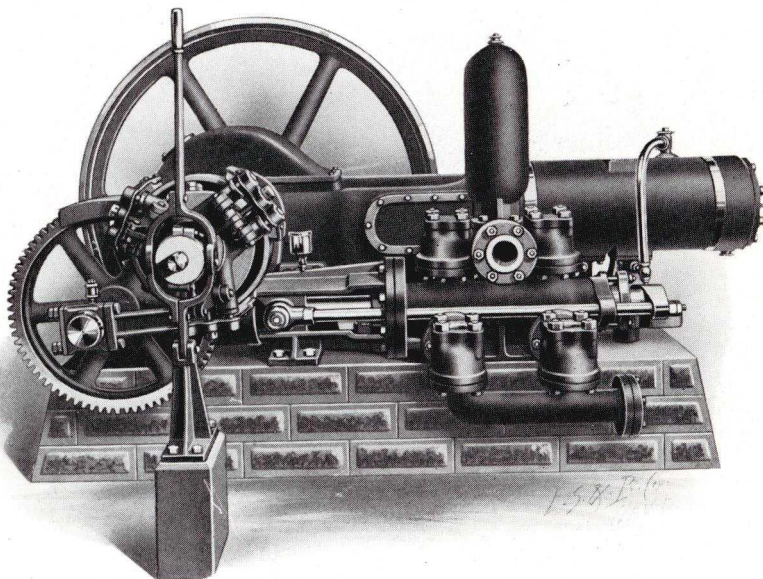
Each unit is most carefully machined, assembled and tested in our shop before shipping.

By coming here you may secure not only a gas pump to exactly meet your lease conditions, but also an engine to operate the pump, thus making the entire plant of Bessemer quality and reliability.

With our organization are capable gas engineers who are anxious to be of assistance to you in solving gas handling problems.

Building these gas pumps as we do in such a wide variety of types and sizes it gives you a selection not procurable elsewhere and at the same time gives you Bessemer quality.

The Bessemer Direct Gas Engine Driven Pumps



15 H. P. and Higher Bessemer Direct Gas Engine Driven Pump,
Enclosed Crank Case

The direct connected Bessemer Gas Engine and Pump illustrated is used extensively for pipe line work where high pressures prevail.

The engine is of the enclosed crank case type fully described in this catalogue, while the pump is a double-acting, outside-packed plunger type designed for extreme high duty.

Pump may be disengaged at any time by means of friction clutch with which each unit is fitted.

On any pumping proposition, private or municipal, for irrigation or reclamation work, our engineers are ready to aid you and recommend the plant best suited to your needs.

More information on request.

"You buy the BEST when you buy the BESSEMER"

Bessemer Gasoline Plants

For the Extraction of Gasoline from Natural Gas

The extraction of gasoline from natural gas brings to the oil and gas producer a source of wealth from the gas that has, ever since the discovery of oil, been wasted. A method of utilizing casing-head gas was eagerly accepted by the oil and gas producer and today gasoline plants are installed on many oil leases, producing more wealth for the owner than the oil production itself.

We were the pioneers in this business, claim a good share of credit for its development, and ALL CREDIT for placing it on a sound, commercial basis.

During its rapid growth from an experiment of dubious worth to an enterprise of unquestioned value, Bessemer has worked with the National Gasoline Industry, developing and perfecting equipment to meet the efficiency standards required under all operating conditions.

The confidence of the Oil Industry in Bessemer compressors and equipment is indicated by the fact that over 90% of the country's gasoline plants standardize on Bessemer.

We have in our employ engineers and chemists who have spent YEARS of research work developing this important industry until we today can act in an advisory capacity to help you to success. The returns from successful gasoline plants are enormous and we have succeeded in perfecting the scientific side of the business until you can install a plant with little risk.

We were led to this research work partly as an aid to our customers and friends in the oil and gas business and partly to find a new field for the sale of Bessemer Direct Gas Engine Driven Compressors, illustrated on these pages, which are peculiarly adapted to the work to be accomplished—compression of the gas, single or double stage, and proper condensation thereafter.

All gases will not produce gasoline in paying quantities. To install a large plant to test the gas would prove too expensive. It therefore remained for our chemists to evolve a method of gas analysis whereby such an analysis could advise the prospective investor of results they might expect to secure from the installation of a plant. This plan our chemists developed.

In connection with our factory is a well equipped modern laboratory in which analyses are made that are reliable and

trustworthy and that will advise you the production of gasoline you will secure from each thousand feet of gas compressed by means of our compressing and condensing equipment.

Method of taking and shipping gas samples is covered in a separate bulletin gladly furnished interested parties.

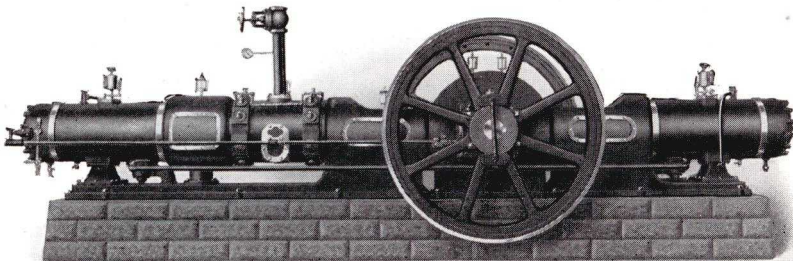
In the event that you will not be satisfied with the laboratory test we can take further precautions for you by means of physical testing plants. These are gasoline plants in miniature, a small engine, compressor and condensing equipment that may be hauled to your leases and actually make gasoline or fail as the gas may or may not be productive.

The extraction of gasoline from natural gas is well worth your full and complete investigation and we ask you to take advantage of our theoretical knowledge combined with years of actual, practical experience installing plants to aid you in determining the value of any gas you may have.

Millions of gallons of gasoline are made yearly in plants containing Bessemer machinery, made from a product that was formerly considered useless. Certainly there is no other industry into which you may enter with so many precautions taken; so many aids looking towards your success.

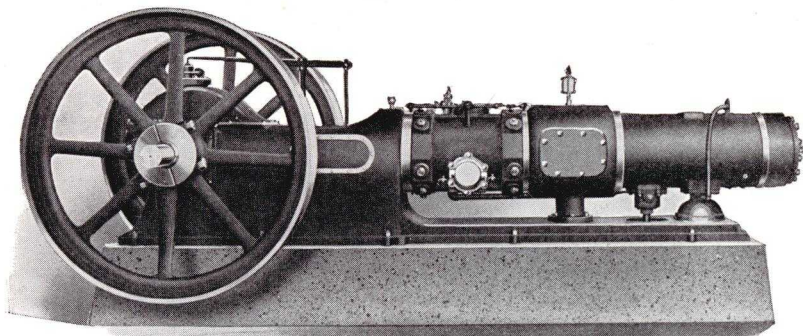
Look upon us as gasoline-from-gas headquarters. By securing our co-operation in the preliminary steps our engineers can undoubtedly be of help to you. We furnish direct driven compressors or belt driven compressors as you may desire. We furnish the machinery alone or with the condensing equipment, or with the complete plant. Compressors and engines in a wide variety of sizes and types, some of which will exactly meet your conditions.

Ask for special bulletins covering this branch of our business. Free upon request.



Type VI Bessemer Direct Driven Air and Gas Compressor

Bessemer Direct Gas Engine Driven Compressors



The Bessemer Direct Gas Engine Driven Compressor, Type VII.

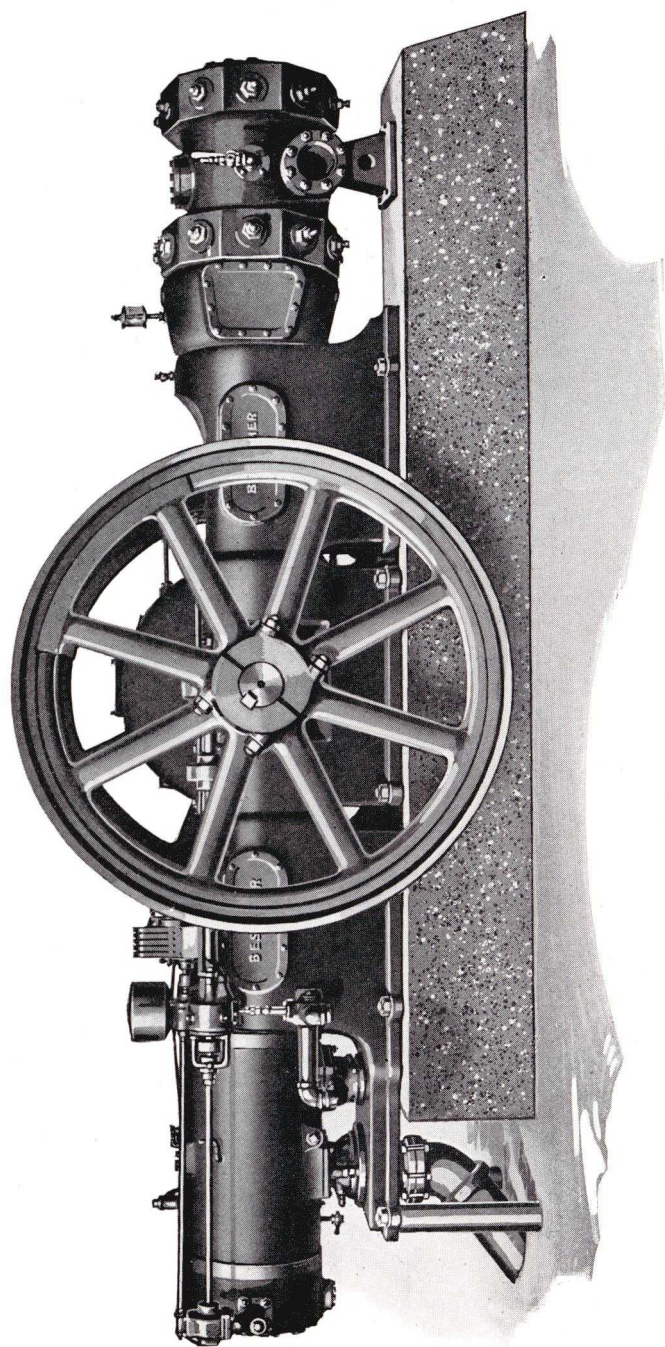
Bessemer Direct Gas Engine Driven Compressors have proven in many hundreds of installations that they are the most efficient and economical means of compressing air or gas.

Combining, as they do, air compressor and gas engine in one unit, they save somewhat in first cost and greatly in installation cost, floor space, size of building required, upkeep cost, and there is no belting expense.

A few of the improvements that have lately been incorporated in the Bessemer Type VIII:

The position of the governor and magneto has been changed from directly over the right hand shaft bearing to a boss on the bed plate just clearing the outer rim of the fly wheel and next to the Power cylinder. The governor and magneto are driven from a layshaft by right angle helical gears, which are housed in by the oil flange—thus lubrication is accomplished by means of the splash system.

THE BESSEMER GAS ENGINE CO.



Type VIII-B Bessemer Direct Driven Air and Gas Compressor

GAS AND OIL ENGINES

This arrangement makes it convenient for the operator to inspect the magneto and give the proper attention to the governor while the compressor is running.

The timing of the magneto is easily taken care of through the adjustment of the lay-shaft and the coupling mechanism of the magneto.

The governor valve is located directly underneath the governor and is coupled to same by a stem which is carried up through the hollow governor spindle to a sliding head of the power mechanism of the governor. The governor valve is equipped with automatic stop so that in case of any of the governor linkage breaking, the valve automatically drops over the gas opening which shuts off the gas supply—thus stopping the engine.

The automatic air starter is of the Piston Valve Type and is operated from a cam which is located on the end of the lay-shaft extending through the governor case. The cam roller is only in contact with the cam when the air pressure is turned on to the piston of the air starter.

Bessemer Compressors are widely used in gasoline plants, and there are but few such plants that do not use them, because they are peculiarly adapted to the work to be accomplished.

Another important industry in which the compressors are widely used is in the transportation of gas through gas mains from the fields to the customers' fires. and practically every gas company is a Bessemer customer for compressors for this purpose.

Many oil producers have gas wells of low pressure, but considerable volume, near to high pressure lines. A Bessemer Compressor will market this gas and make such idle wells profitable by raising the gas pressure to exceed the line pressure.

Another use for Bessemer Direct Gas Engine Driven Compressors is the increasing of oil production by placing an air pressure on the oil sands, and here again they have proved most economical.

For use in factories, mills, mines and quarries, for flowing water wells, for pumping oil wells by air pumping heads, or for any purpose requiring compressed air, Bessemer Compressors

are fulfilling the requirements more advantageously and more efficiently than any other available method.

An additional use for the Bessemer Type VIII Compressor is found by replacing the regular air or gas compressing cylinder with an ammonia cylinder and using the unit in raw water ice plants.

We build compressors in units or combinations of units to handle from a few thousand to millions of feet each day. One and two-stage.

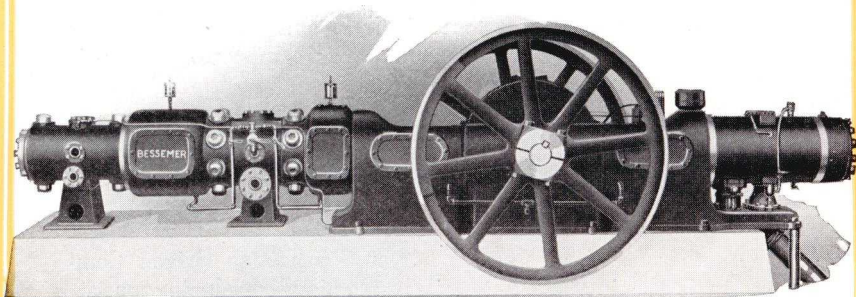
Thousands of installations, operating under every conceivable condition, are visible proofs of the practicality of Bessemer Compressors.

Out in the oil fields, where the knocks of service are hardest, batteries of Bessemers are pounding out 99% operating records—month after month, year after year. This limitless dependability has enabled Bessemer to maintain an undisputed leadership for over a quarter century.

What can be more convincing testimony of their correctness in engineering principles, quality of materials and skill in manufacture?

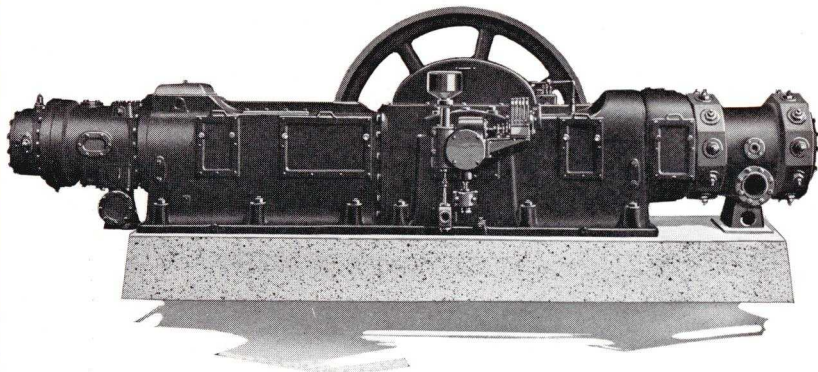
Time proves that

"You buy the BEST when you buy the BESSEMER"



Bessemer Type IX Direct Gas Engine Driven Compressor, Two Stage

Bessemer Type Ten Compressor



Showing 80 H. P. Type Ten-S with 16" Bessemer Cylinder

The latest Direct Driven Bessemer Compressor is known as BESSEMER TYPE TEN. It has been offered to the oil industries and others only after the most thorough tests and rigid inspections, confirming in every detail the skill of its designers. The gruelling tests to which this new unit has been subjected prove beyond a doubt that the new TYPE TEN is proving a valuable unit to the trade. Especially where 165 H. P. units are required.

In bringing out this new Type Ten Compressor we do not intend to discontinue the manufacture of any of our present line of Compressors. The TYPE TEN embodies some special features not incorporated in the famous Type VIII, which has been so universally adopted that many machines of similar design are known as Type VIII, regardless of the manufacturer.

A few of the features embodied in the Type Ten are:

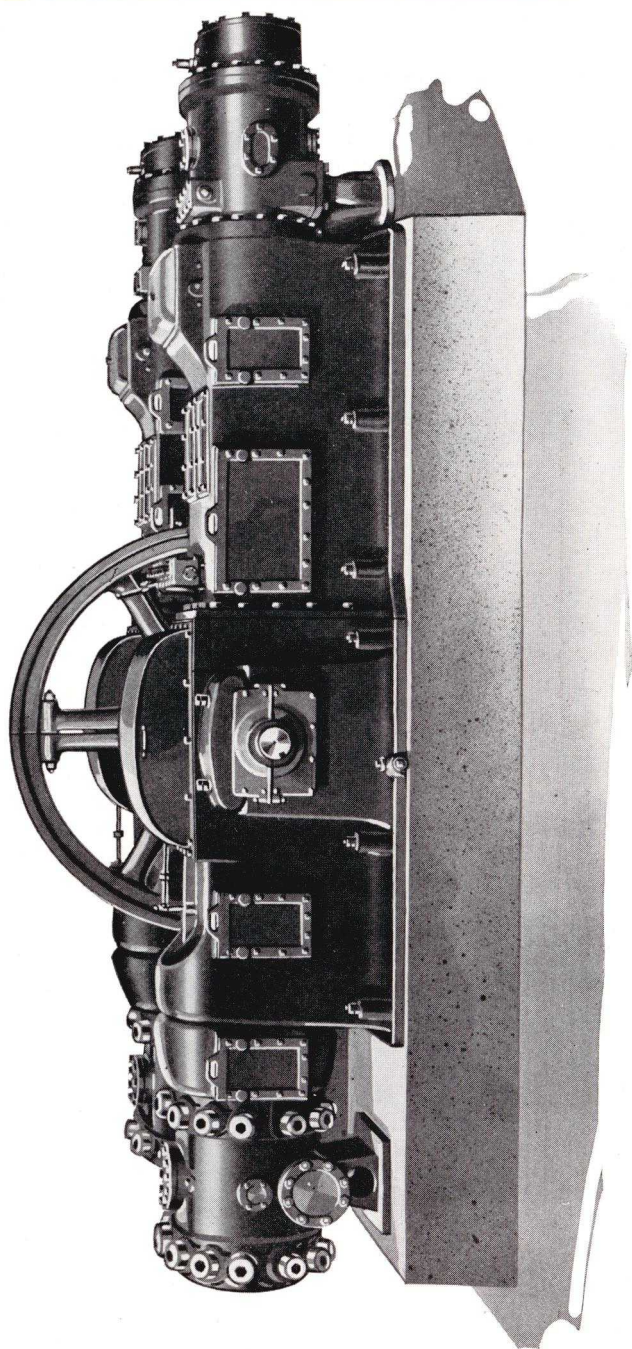
The bed extends out close to the exhaust connection on the cylinder, thus doing away with the necessity of having other cylinder support.

The cylinder is secured to the bedplate by outside bolting, which makes it easy to assemble and dismantle.

The stuffing box is entirely independent of the cylinder, it being bolted to a special flange on the inside of the bed.

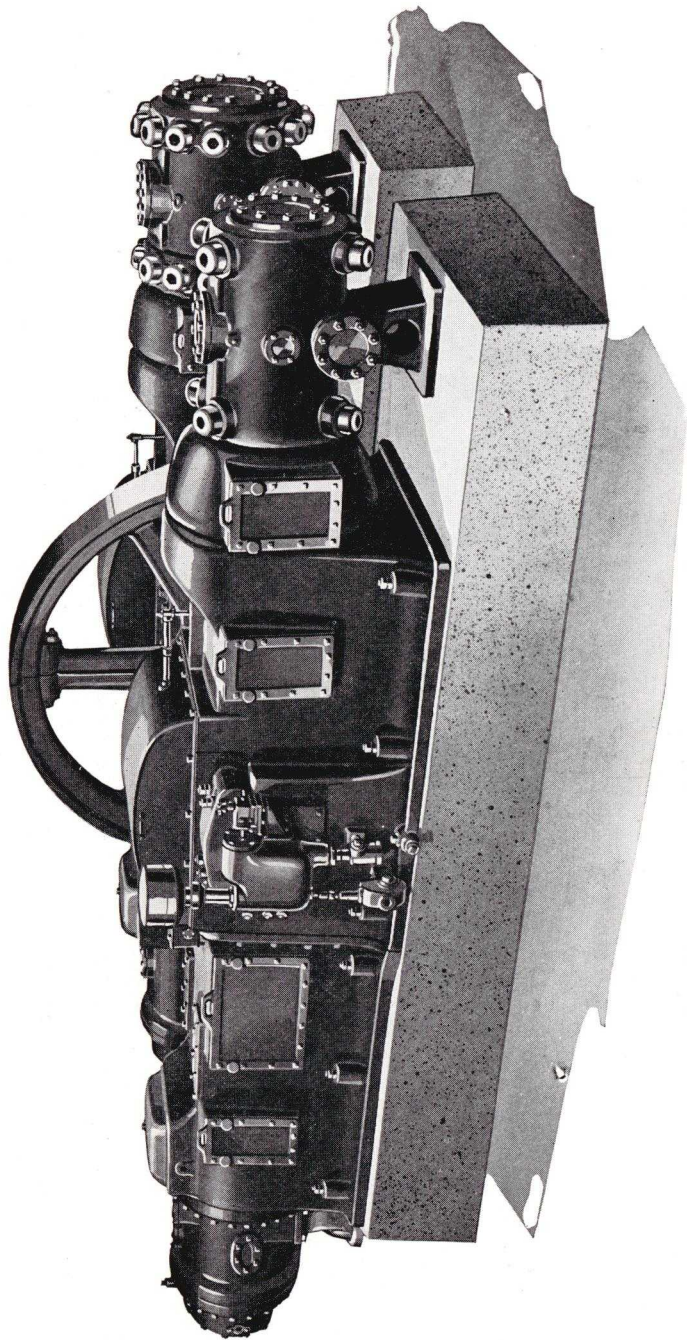
The air and gas valve is located directly on top of the bed. It is independent of the cylinder, cylinder can be removed with-

THE BESSEMER GAS ENGINE CO.



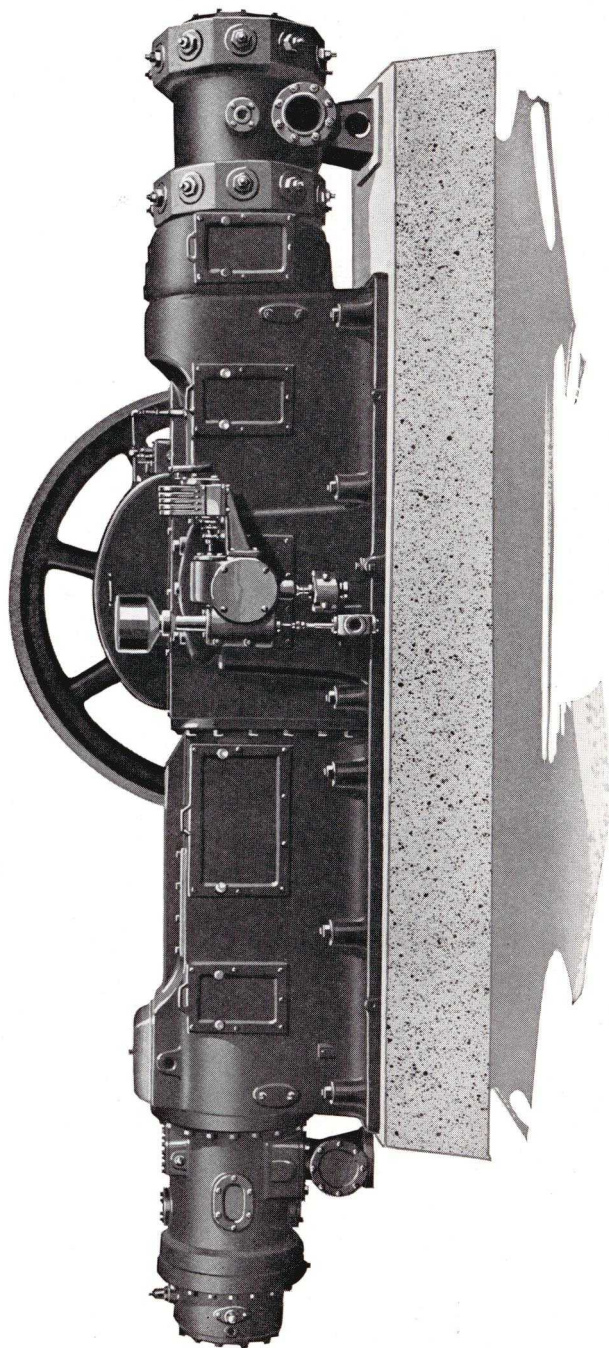
Bessemer 165 H. P. Type Ten-D Air and Gas Compressor, showing opposite side from Governor

GAS AND OIL ENGINES



Bessemer 165 H. P. Type Ten-D, showing Governor side equipped with 7" and 14" Bessemer Cylinders

THE BESSEMER GAS ENGINE CO.



Showing Governor Side of 80 H. P. Type Ten-S Direct Driven Compressor

GAS AND OIL ENGINES

out having to dismantle any piping for the air and gas. A cored passage is provided in either side—one for the air, the other for gas.

The ignition system and governor are driven from the same gear mounted directly on the crankshaft. The simple and accessible grouping of these parts without a layshaft is made possible by using one flywheel instead of two, whether it be a single or duplex machine.

The water jacket in the cylinder is independent of the water jacket in the cylinder head. The cooling water is under control at two different points, so if the cylinder head needs more water than the cylinder it can be adjusted independently. The water jacket has a large opening on the side for inspecting and cleaning the jacket.

The air Compressor piston is driven by means of four tie rods attached directly to the power end crosshead and from that point to the Compressor end Crosshead. They are very accessible in case it is necessary to dismantle the engine.

The exhaust pipe is 10" instead of 8" and instead of going down with a 45° ell goes straight down from the cylinder, so that there is no chance of leaky exhaust or any back pressure from the exhaust line.

Double stuffing boxes are used for both the power end and the compressor end, the distance between the stuffing boxes is such that a very small portion of the rod which is exposed to the splash of oil reaches the second set of packing.

This compressor is built in both the single and duplex types. In either case a single flywheel is used. On the single cylinder unit an outboard bearing is used. In the duplex type the two units are connected by the one split flywheel which has a special coupling in the hub to receive the two separate shafts.

These are just a few of the many desirable features to be found in this Type Ten Compressor.

Ask us for special bulletin on

BESSEMER TYPE TEN COMPRESSOR

The Bessemer Oil Engine Driven Compressor

**For Mines, Quarries, Shipbuilding, Construction Work
or any Compressed Air Requirement**

Here is a companion to the popular Type VIII Direct Gas Engine Driven Compressor.

It is an oil engine driven compressor—a combination of the Type IV Bessemer Oil Engine and a compressor cylinder capable of operation at engine speed.

It is not new in the sense that newness would imply that it is experimental. The engine end is the wonderfully successful and economical Type IV Bessemer; the compressor end is as well known. This combined unit has demonstrated its trustworthiness during many years of operation.

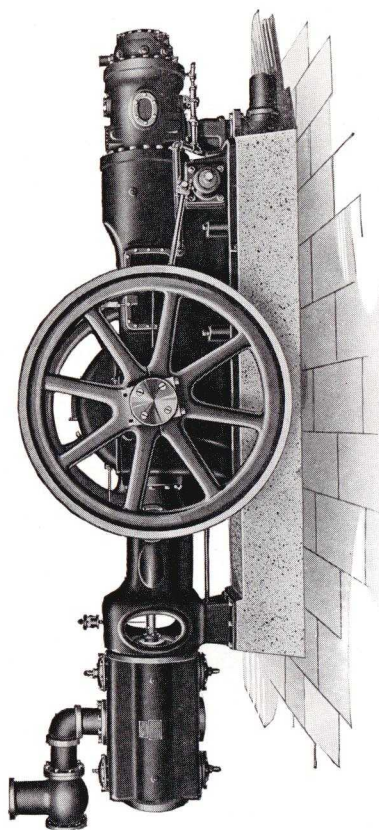
Such a unit has a number of advantages over the two unit installation such as space, weight, efficiency, foundation expense, belting expense and upkeep expense.

Although of the heavy duty stationary type, it is capable of being “knocked down” for transportation to mines, quarries, etc., in inaccessible localities.

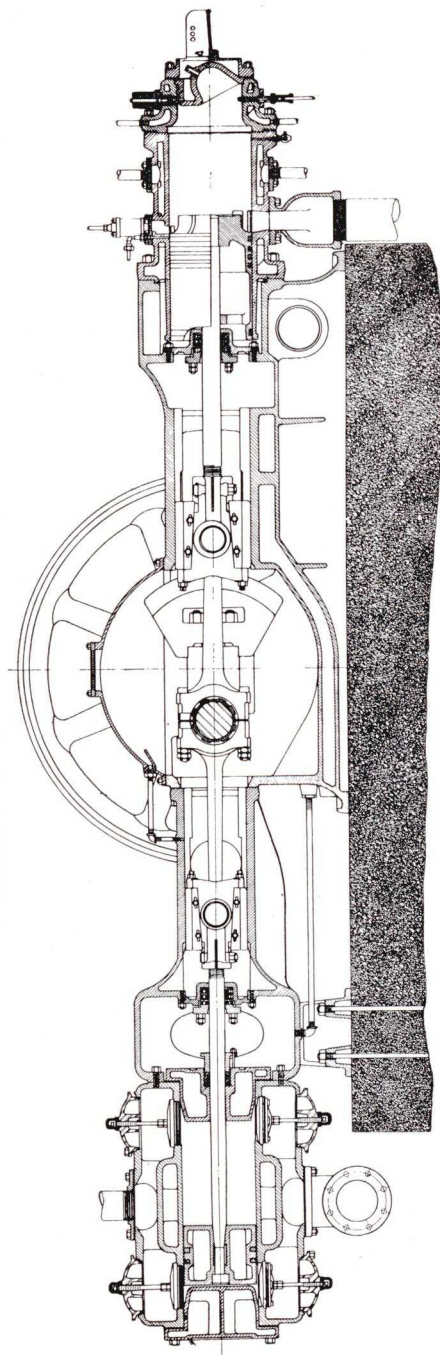
You should operate this Bessemer Oil Engine Driven Compressor at one-fourth the cost of a gasoline engine driven compressor, less than one-half the cost of two-cent electricity or less than one-fourth the cost of four-cent electricity.

The illustration is of an 85 H. P. Bessemer Oil Engine operating at 250 R. P. M., direct connected to an 11½" x 20" compressor cylinder. This unit has a net delivery of 340 cu. ft. per minute, with pressure condition of 0 lbs. intake to 100 lbs. discharge, considering 14.7 lbs. atmospheric pressure.

“You buy the BEST when you buy the BESSEMER”

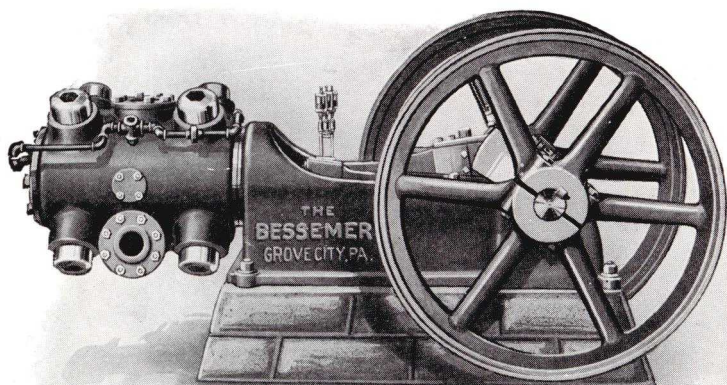


The Bessemer Direct Oil Engine Driven Compressor



The Bessemer Direct Oil Engine Driven Compressor—Sectional View

Bessemer Belted Compressors



Single Stage Belted Bessemer Air Compressor

We recommend the use of Bessemer Direct Gas Engine Driven Compressors, but if you should for any reason prefer the belted type, we manufacture them in single and two stage types in a wide variety of sizes. Bessemer Compressors are built heavier and stronger than customary and the Bessemer Disc Valve used makes a most efficient machine.

Bessemer Belted Compressors are especially popular with owners of small oil leases who already have power installed and who desire to install a compressor for extracting gasoline from the casing-head gas.

Two-Stage Belt Driven Compressors

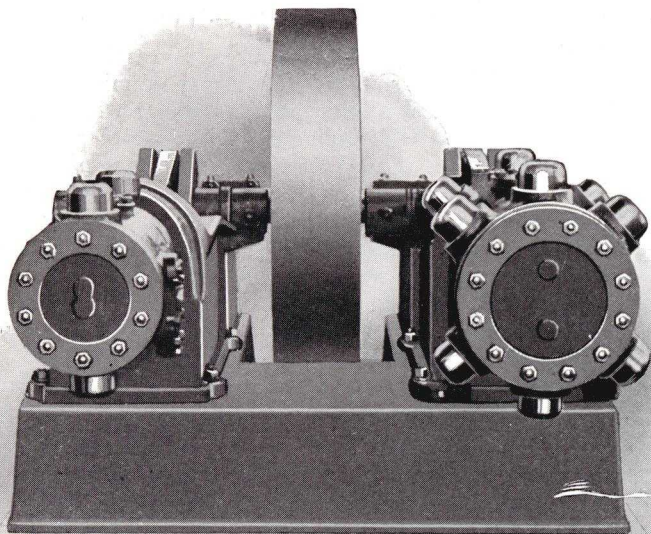
When two-stage compression is required, as is so often the case in gasoline plants, arrangement is made as cut shows, the high and low stage units being mounted on the same sub-base,

with flywheel drive placed between the two units. The crankshaft is a one-piece forging, with throws set at an angle of 90° . The four wide bearings and the center crank construction will appeal to your good judgment. The same great strength—the same long-wearing characteristics of other Bessemer products are all contained in the belt driven compressor.

Bessemer Belt Driven Compressors, both one and two-stage, may be arranged to be driven by belt, rope, silent chain, from gas engine, steam engine or motor.

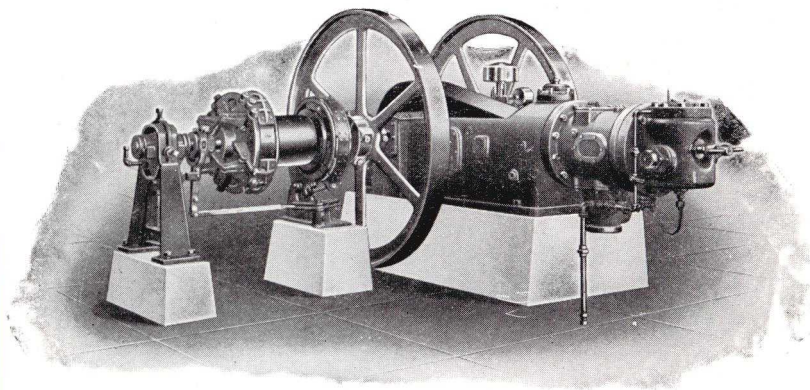
Maintenance and upkeep expense are always at a minimum when Bessemers are used. The materials used, the workmanship employed, the careful testing—all make for your protection.

We will send further description and prices if you will make known your needs. Our engineering organization is entirely capable of handling any compressing problems that may arise and will gladly co-operate with you towards solving your gas problems.



End view Bessemer Two-Stage Belted Air or Gas Compressor

The Bessemer Type OD Oil Engine



The Bessemer Type OD Oil Engine with Bessemer Reverse Clutch

The Bessemer Oil Field Oil Engine, better known as the Bessemer Type OD Oil Engine, is fully illustrated and described in a separate catalog that we will gladly mail you on request.

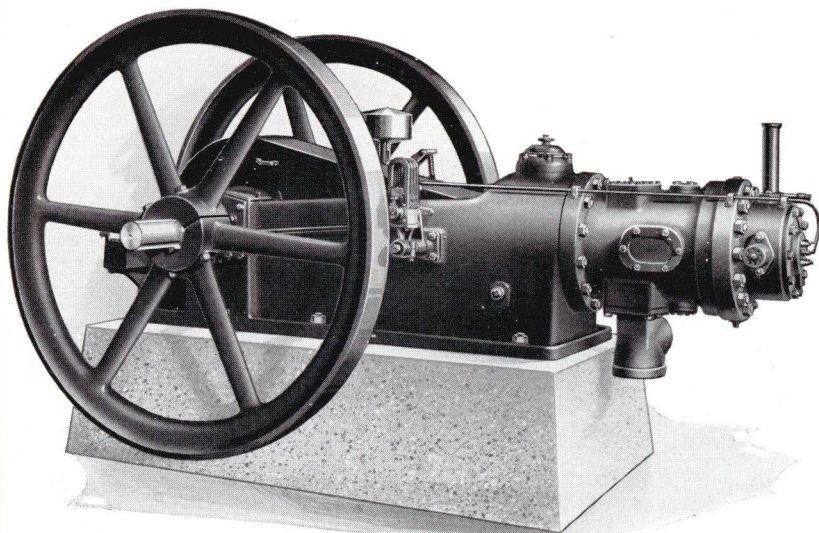
This Bessemer OD Oil Engine was designed and built especially to meet the needs of the Oil Field. The fact that it will meet these exacting needs, of course, makes it adapted to general commercial power work, such as mills, mines and factories, irrigation and reclamation projects, electric lighting, etc.

The Bessemer OD Oil Engine is exceptionally popular in the oil fields. It meets a need that has existed for some time.

This requirement calls for an engine that may be bought as a gas engine and later used, with slight changes, as an oil engine. An oil engine of variable speed; an engine that will burn a wide range of oils and be so simple that those untaught in oil engine practice may secure the best results; an engine with a cross-head; an engine to give 365 days' service each year and be sold at a comparatively low figure.

So the Bessemer OD Engine was designed and built and is now going out into the oil fields to fulfill these requirements.

The OD Bessemer is built in four sizes, viz.: 15 H. P., 20 H. P., 25 H. P. and 35 H. P. Note the enclosed crank case admitting of splash lubrication of cross-head, crankshaft and their bearings. This also protects the wearing parts from the sands of the desert fields. Cylinder is oiled by a mechanical force feed lubricator. No electrical ignition is used, a new patent combustion chamber creating the heat for ignition after engine has been started by the usual torch. This head maintains a constant degree of heat regardless of load.



The Bessemer OD Engine arranged to use Natural Gas

A wide speed range is another exclusive Bessemer OD feature. A pumping speed of 160 R. P. M., a normal power speed of 250 R. P. M., and a "pulling out" speed of 400 R. P. M., if you want it.

The Bessemer OD Engine can be sold you as a gas engine, used as such as long as gas is available and then, by changing cylinder head and adding a fuel pump, run on oil.

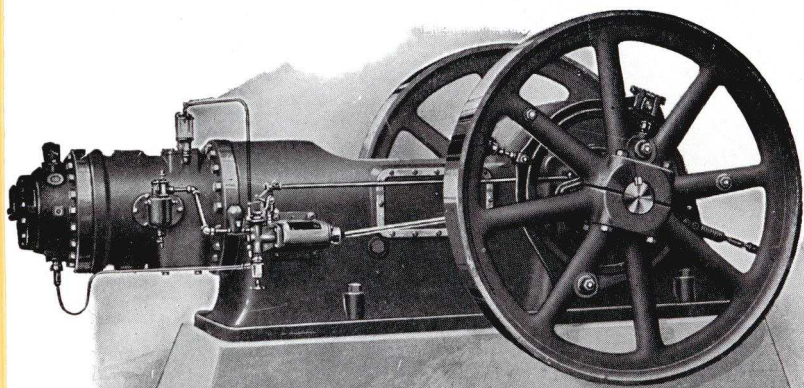
The fuel range is wide. It of course includes the crude oil as it comes from the wells, but if conditions permit, it is not necessary to use the crude oil but rather the less valuable fuel oils. Government tests of Bessemer Oil Engines before they were installed behind the American lines in France necessitated their successful operation on every combustible from alcohol and gasoline to asphaltic base crude oil of 17 gravity.

The OD Bessemer Oil Engine does not employ water injection as does the Type IV Bessemer, this change being due to the demand for engines in these sizes to operate in the oil fields where frequently nothing but brackish water is available; also for the reason of its being a variable speed engine.

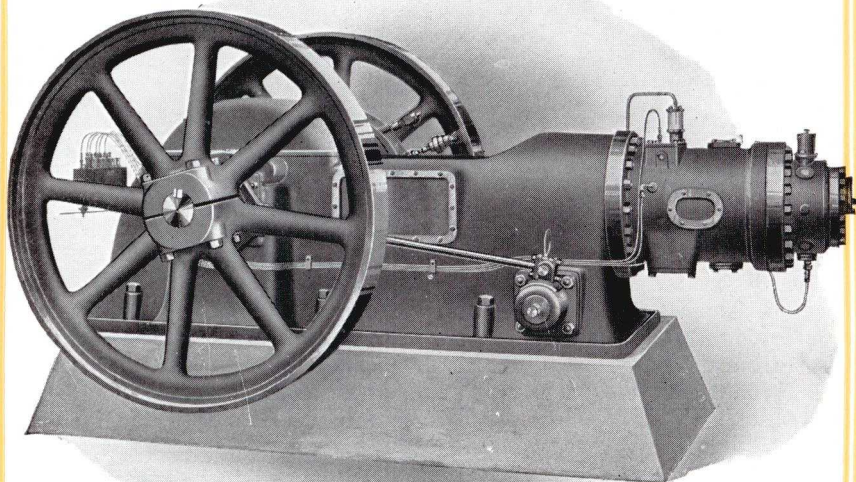
Our constant temperature cylinder head fitted to this type engine allows the same economy of fuel and freedom from carbon deposits as with water injection.

Write for special OD Catalogue if interested in Oil Engines.

Bessemer Type 4 Oil Engines

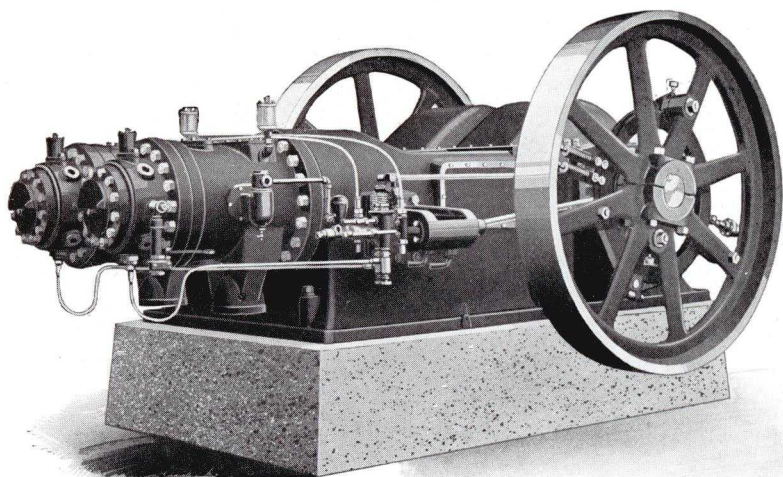


Type IV Bessemer Oil Engine, Single Cylinder, governor side



Type IV Bessemer Oil Engine, single cylinder, valve side

Bessemer Type 4 Oil Engines



Type IV Bessemer Oil Engine, twin cylinder, governor side

In the districts that are not served with natural gas, the Bessemer Oil Engine offers the most economical means of power production.

They operate on the fuel oils and some crude oils that are so abundant and easily secured.

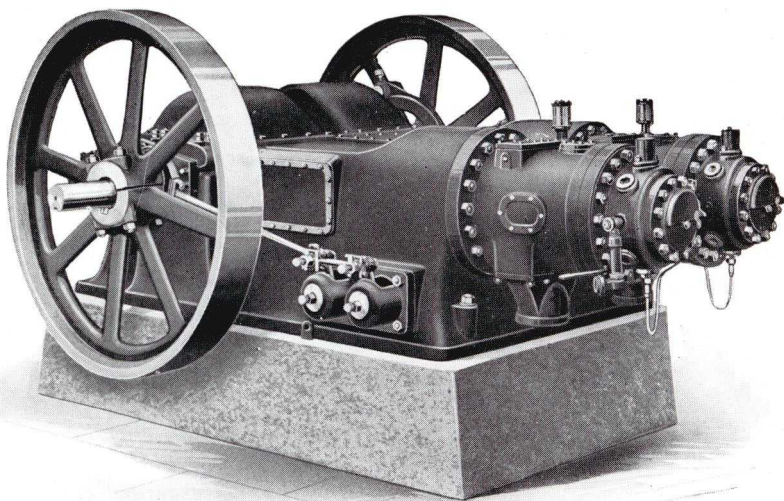
The horse power ranges from 25 H. P. to 180 H. P. in single and twin cylinder types.

Bessemer Oil Engines, Type IV, are offered you as the most modern type of pump injection oil engine, and as the first oil engine to combine simplicity with economy, and added to these attributes are dependability and reliability.

Bessemer Horizontal Oil Engines, like Bessemer Gas Engines, are built with a cross-head; adjustable main bearings; crank case entirely enclosed; they use no magnetos, spark coil or batteries; are two-cycle; have governor affording closest regulation; run smoothly and economically on light load as well as full load, and are conservatively rated, permitting overload if necessary at times.

They are the result of many years of well-directed effort by our engineering organization, and the years the engines have been in service have proven them without a peer in the history of internal combustion engineering.

They are used in pipe line work, in irrigation and reclama-



Type IV Bessemer Oil Engine—Twin Cylinder, Valve Side

tion service, in private and city lighting plants, in refrigeration and ice factories and for any purpose requiring power.

Are you worried over the coal situation? Are you hoping against hope that there will not be a recurrence of the usual coal shortage?

Or are you buying electricity from the central station, forgetting that coal is necessary for the central station's operation.

Or are you facing the winter months with assurance, a Bessemer Oil Engine in your plant.

Surely the oil engine, the modern power producer should NOW appeal to you, even though you may have been content with the older forms of power production heretofore.

It will bring not only peace of mind in knowing that a coal famine will not affect you as far as power production is concerned, but it will bring you power economy unthought of in a steam plant or power purchased from a central station.

With this economy comes a clean, safe plant, compact and self-contained, reliable and dependable.

The money saving is sometimes enormous. Our comparisons will be fair to all forms of power. Write us your present situation.

If we can't save you money, don't buy. We ask your fullest investigation.

A Special Catalogue fully illustrating and describing Bessemer Type IV Oil Engines will be sent on request.

Bessemer Diesel Oil Engines

For a number of years past we have felt the need of a vertical multiple cylinder oil engine. A great many of our customers who standardize on Bessemer equipment have been particularly anxious that a product of this kind be added to our already large line of machinery. The absence of such an engine has been keenly felt, especially for the marine trade, steam shovels, dredges, electric light service, pipe lines, and like work.

Knowing the urgent need and demand for an engine of this type, our engineers have spent many months both in Europe and in America checking up on practically every known oil engine of merit. Out of all this mass of knowledge and experience plus experimentation carried on in our own factory we have evolved the BESSEMER DIESEL OIL ENGINE.

This engine is the combined product of over 30 years' experience of one company and over 27 years of our own experience in building internal combustion engines. Many hundreds of these engines have gone out into various kinds of work and are performing good continuous efficient service.

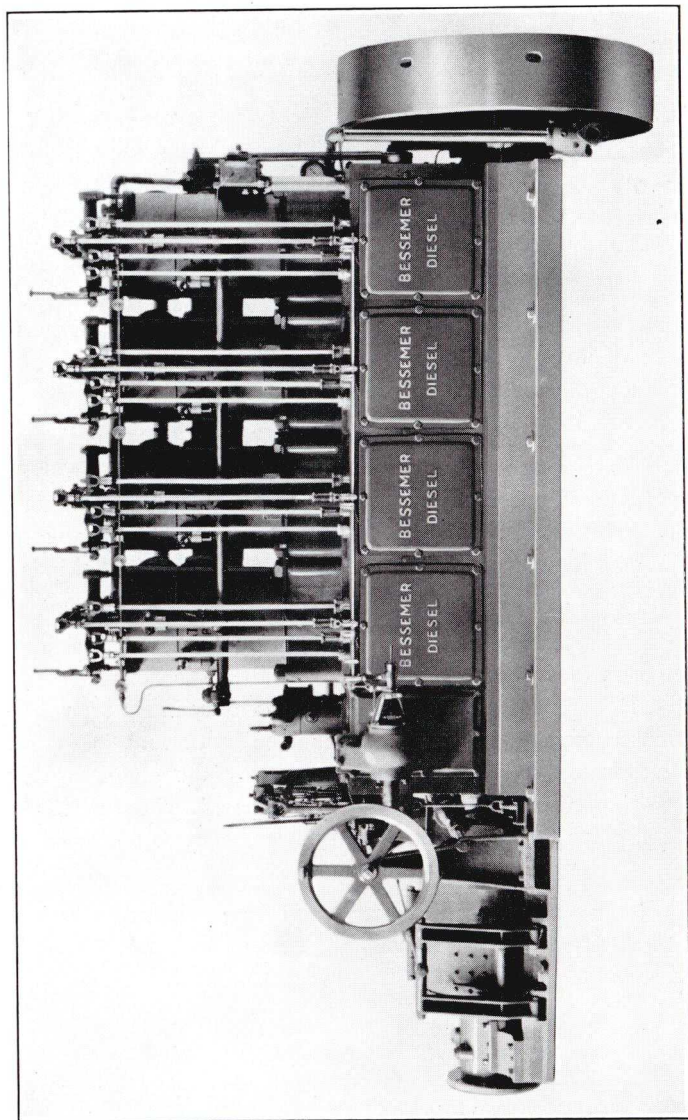
The Bessemer Diesel Oil Engine is a four-cycle engine of the solid injection type. It is built in sizes ranging for 50 H. P. to 1000 H. P. and in 3, 4 and 6 cylinder types. This engine is especially adapted to marine work and is very extensively used on the Pacific Coast for this class of work. It is also built in the stationary type and is likewise suitable and desirable for electric light service, steam shovels, dredges, pipe lines, etc.

The governor used is very sensitive and accurate, which permits of a wide speed range. Low grade, cheap fuel oils which are obtainable in almost any part of the world can be successfully used.

The fuel consumption is exceptionally low. The method of injecting the oil is such that perfect combustion is secured—resulting in practically no carbon deposits and a clean exhaust.

There are two lubricating oil systems. The primary system

THE BESSEMER GAS ENGINE CO.



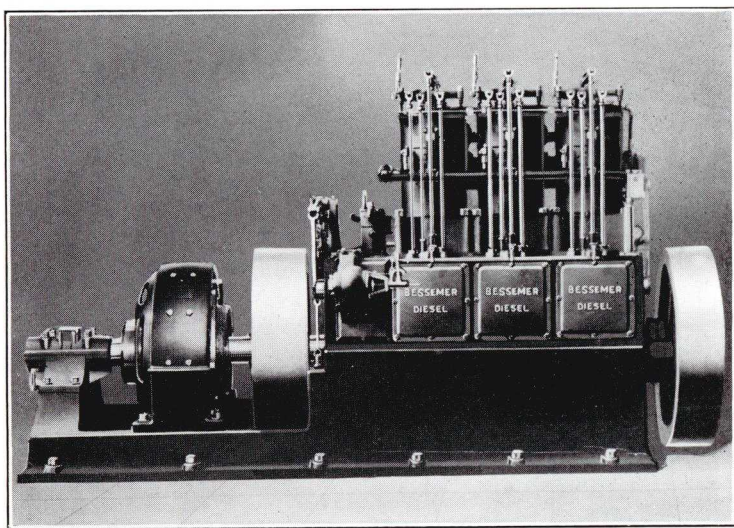
Showing 4-Cylinder 235 H. P. Marine Engine

GAS AND OIL ENGINES

consists of a mechanical oiler supplying fresh oil to the cylinders. The drip from the cylinder walls is caught in the base and is pumped through a filter to the reservoir. Another pump delivers the filtered oil to the main bearings through the drilled crankshaft and hollow connecting rod to the wrist pin.

All bearings are over size. The main bearings are full shells lined with the highest grade of bearing metal obtainable. These shells are easily replaced without removing the crankshaft.

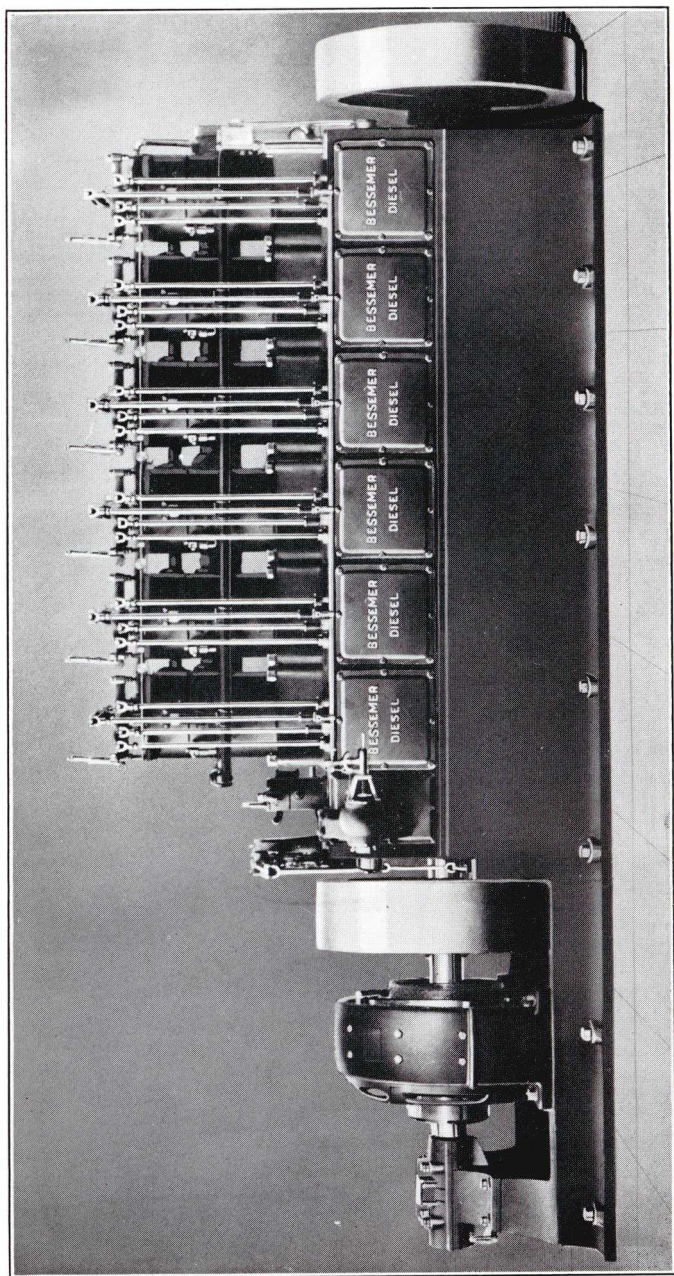
This is a strictly high grade engine and is sold at a reasonably fair price. Permit us to tell you more about it. Ask for a catalogue on Bessemer Diesel Vertical Oil Engines.



3-Cylinder 175 H. P. Bessemer Diesel Oil Engine, Stationary Type
Direct Connected to Generator

"You buy the BEST when you buy the BESSEMER"

THE BESSEMER GAS ENGINE CO.



Bessemer Diesel Oil Engine—6 Cylinder, 360 H. P., Stationary Type Direct Connected to Generator

GAS AND OIL ENGINES

Meeting The Oil Producer's Needs

We have in our organization a factory with the equipment and facilities capable of meeting your power requirements regardless of their range in size or type.

If you have a group of wells to be pumped—then you will likely require a 15, 20, 22½, 25, 30, or 35 H. P. engine. Bessemers are built in all these sizes and there are Bessemer Roller Pumping Powers of the proper size to suit them.

In deep territory you will likely require an engine to each well and this engine to be equipped with reverse clutch for cleaning out, pulling rods and tubing. Such requirements usually call for 15 to 35 H. P. Bessemer Gas Engines and with the Improved Bessemer Reverse Clutch furnish you the ideal equipment.

If you consider a vacuum on the oil sand desirable there are Bessemer Gas Engines to operate the pumps and Bessemer Gas or Vacuum Pumps in a wide variety of types and sizes, single and duplex.

Or, perhaps you desire to go to the other extreme and place air pressure on the oil sands. Then here you will find Bessemer Compressors to exactly meet the conditions.

Or you may desire to drill with a gas engine. Quite a number of concerns are doing it. There are Bessemer Gas Engines and Bessemer Reverse Clutches that will accomplish this work successfully.

You may have large vacuum pumps to run, air compressors to operate, gas to force from the fields to the cities, gas from low pressure wells to be forced into high pressure lines, you may need a gasoline plant—there are Bessemer Gas Engines to do your work; there are Bessemer Compressors, both direct driven and belted, to compress your gas, or furnish compressed air; there are Bessemer Engines and Compressors for gasoline plants; there is a Bessemer for any purpose.

Do you see the way in which our interests are interlaced? There is no requirement that can come up but that there is the reliable, dependable Bessemer Engine to meet it. We can be of service to you; we can save you money.

Look on us as headquarters for anything you need in the way of power equipment. Look on us as a firm anxious to serve you, as a firm who can supply you with better equipment at money-saving prices.

THE BESSEMER GAS ENGINE CO.

With us are capable engineers who will solve your oil, water or gas pumping problems without cost or obligation.

Join the many important oil companies and producers who rely on us to furnish them with whatever they need. You will find it desirable, convenient and economical and you will be furnished with the high Bessemer quality backed by the good Bessemer guarantee.

The Bessemer organization covers the oil fields of the United States. We maintain warehouses and service men throughout the oil fields. Write us or permit a Bessemer man to talk to you.

If we cannot prove to your satisfaction that it is best to buy Bessemer—if we cannot prove that it is to your interest—you will not be urged. On this basis we solicit your inquiries.



Bessemer Building, Tulsa, Okla. Size 60'x120'. Contains over 21,000 sq. ft. Floor Space

Illustrated above is the Bessemer Building located at Tulsa, Okla. This building, which contains over 21,000 square feet of floor space, is stocked with a very large number of practically all parts used in the various Bessemer products. Thus, if an accident occurs to the Bessemer machinery the Mid-Continent operator need not be without the service of any Bessemer equipment, except for a short time.

This service at Tulsa is just typical of the Bessemer service which prevails throughout the U. S. oil fields.

"You buy the BEST when you buy the BESSEMER"

GAS AND OIL ENGINES

The Bessemer Factory

We extend to you a cordial invitation to visit our factory, illustrated on page 2, and investigate our methods of casting, machining, assembling and testing Bessemer Products. You will find our factory to be a veritable exposition of modern machine tools, each manned by skillful, capable workmen.

Beginning at our Foundry you will find a modern, well-equipped building 100 feet wide by 647 feet long. This makes a continuous moulding and chipping floor, and is served by four large and two small traveling cranes.

Paralleling the foundry is a vast stock-yard, where huge quantities of pig iron and coke are stored. Here electrical cranes equipped with magnets and grab-buckets handle mechanically and automatically the raw products from car to cupola door.

Adjoining the foundry on the opposite side is a modern equipped pattern shop and pattern storage room. Here, too, are the core-rooms and ovens, sand-mixing machinery and ram-up shop. Four electric traveling cranes serve these floors. Many of the castings are made in dry-sand moulds, the method that is, in many instances superseding the green-sand moulds used heretofore.

The Foundry has in use two huge cupolas from which pour the carefully mixed irons to make Bessemer castings. The quality of these castings is guarded by our laboratory in charge of a chemist specially trained in metallurgy. Into the machine shops the castings come, where one of the largest milling machines ever constructed, together with smaller ones, machine the bed plates. The Cylinders pass to six special boring machines, where they are machined by solid reamer heads. They are then ground to an automobile cylinder finish. It was impossible to secure a machine suitable for this work, so a special grinder was imported from abroad. This machine will handle any cylinder from 7" up to 25" diameter, and length up to 66". It will grind the bore accurately to within one-half thousandth of an inch.

The flywheels are sent to large boring mills, which bore the hubs and face the rims at one setting, insuring true running wheels.

The small parts are distributed to a wide variety of lathes, shapers, planers, milling machines and automatic machines of various kinds. The assembling of these parts into the complete engine and the testing of the engine is accomplished in our large testing room, where 50 engines may be assembled and 30 may be tested at one time, and thus one engine need not be hurried off to make room for another. Every test is thorough

and complete. Six large electric traveling cranes and 12 electric two ton gib cranes, and many one ton hand gib cranes serve the machine shop floors.

Every means for economical production is used that we may give the utmost value for the money we ask you to invest. Quantity production further assists to this end.

We might go on enumerating the various buildings that go to make up the mammoth machine shop, however, suffice it to say that the total floor space of our whole plant is in excess of 370,000 square feet.

Here, too, you will find an engineering organization which is not only willing but anxious to be of service in solving your power problems.

Come and see that our claims for Bessemer superiority are based not on mere words, but on actual facts. You will find our claims for superiority to have been conservative, and when you have been through this, perhaps the largest and certainly the best equipped exclusive gas and oil engine factory in the United States, you will believe what owners of over 32,000 Bessemers know, *viz.*:

"You buy the BEST when you buy the BESSEMER"

What Bessemer Means to Power Users

The Bessemer Engine is a product of proven efficiency and economy built by an organization of specialists in gas and oil engine design and fabrication.

For over twenty-seven years Bessemer has been the leader in the gas engine industry. The huge Bessemer plant specializes on this one line—building only the best.

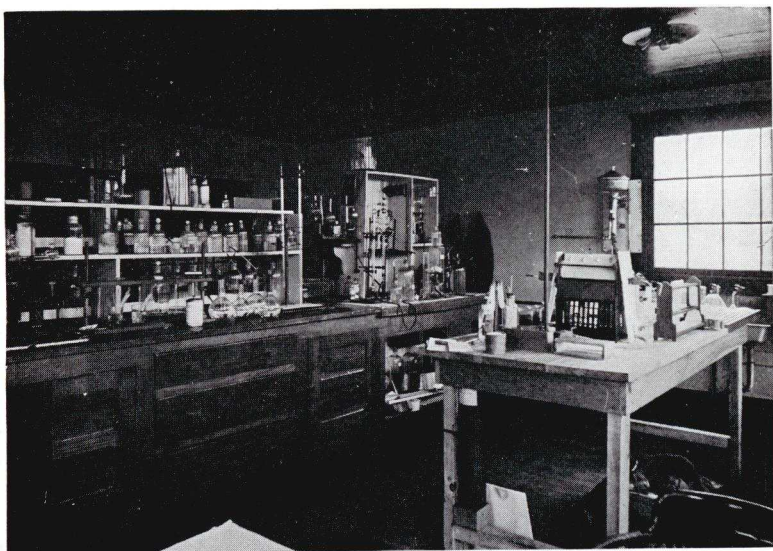
Back of every Bessemer Engine are the facilities of one of the largest plants of its kind in the world; skilled engineers and workmen who *know* engines and build the *best* into them.

The huge Bessemer plant is equipped with the very latest in machine tools, material-handling and engineering equipment.

Seventeen overhead cranes are operating continuously. A fleet of electric tractors is always busy and special machine tools of the highest efficiency only are used. No improvement in manufacturing methods is ever overlooked by Bessemer if the fabrication of Bessemer products can be improved.

From foundry to test-block every piece of material is built, machined, tested, assembled and inspected by *experts* schooled to the high Bessemer standards.

When a Bessemer product is shipped it goes out with the Bessemer guarantee and backed by the Bessemer reputation for building the best for over a quarter century.



A corner in the Metallurgical Laboratory

Guarding the Quality of Bessemerers

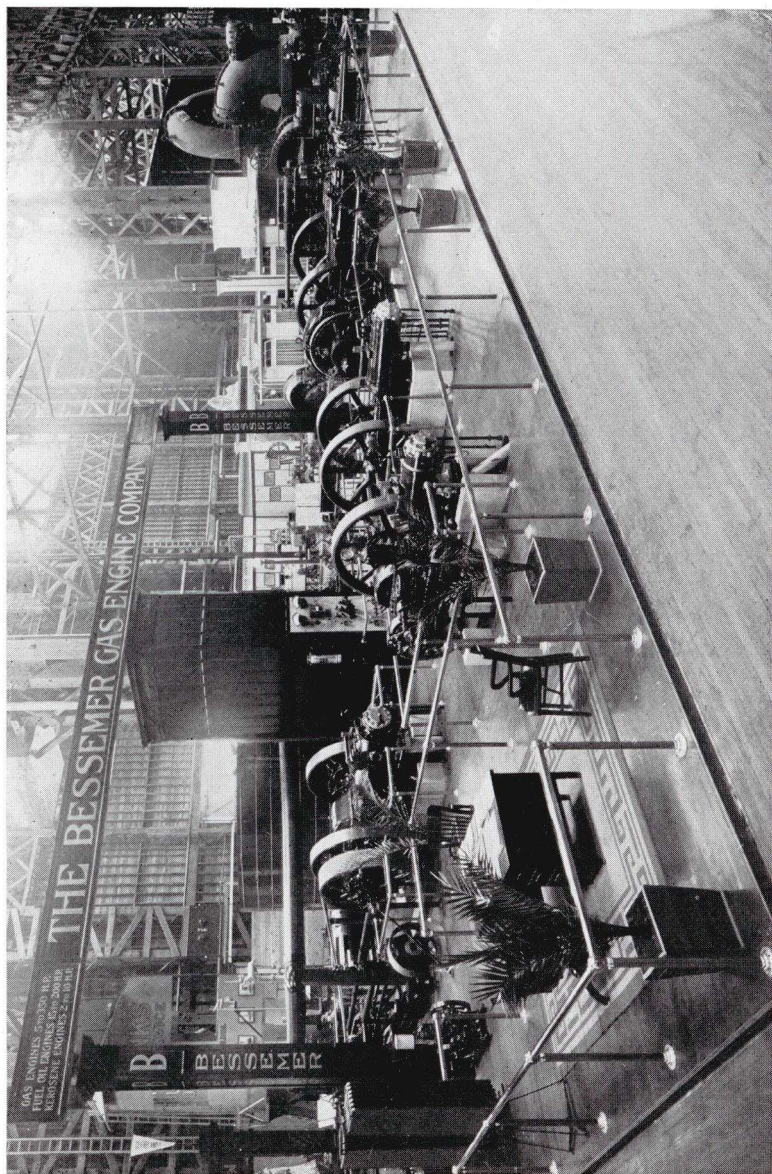
There is no guess work about either the design or construction of Bessemerers.

We maintain a complete metallurgical laboratory, perhaps the only one maintained by an exclusive gas engine concern in the whole United States. Thus the quality of the iron, steel, bronze and babbitt is proven—not left to hit and miss methods that may or may not be right.

Bessemer Engines being built from pig iron to complete engine under one roof, the constant vigilance we desire can readily be achieved. As the pig iron arrives it is analyzed to see that it is up to specification. Similar precautions are taken with the other metals. Then after the castings are made, tests are again made. All through the process of manufacture this surveillance and inspection continues. Then each completed unit is carefully tested, so that when the engine is shipped you have every assurance that it is right in material, workmanship and service.

So-called efficiency methods that would sacrifice quality of either materials or workmanship to speed have no place in our shops.

THE BESSEMER GAS ENGINE CO.



Bessemer's were Awarded Gold Medal at the Panama-Pacific Exposition

GAS AND OIL ENGINES

In Conclusion

A catalogue can only be general. Let us be specific by your advising us of your power situation and thus permit us to advise and suggest intelligently. You may know just what a Bessemer installation will mean to you before it is necessary to spend one cent.

The power plant is the heart of your lease—not a wheel can turn, not a belt can run without an engine room behind it. With a poor power plant the entire lease is affected unfavorably.

The operation of this power plant must be charged against your profits. If its operation is costly, your profit margin must be close. If the cost of running the plant is reduced, it means larger profits to you and the placing of money in your own bank account instead of another's.

A comparison of the various forms of power available will satisfy you that a Bessemer will save and make money for you from the day on which it is started. If such a result cannot be achieved it would not be our desire to sell you.

We ask for your business after you are satisfied that we can serve you best. We ask for it not on promises, but on actual guaranteed results based on the experience not only of hundreds but thousands of other business concerns, oil producers, factory, mill and mine owners and what they have accomplished with Bessemers.

It is our intent to sell you not alone engines, but engine service, and you will find Bessemer offices and service stations or distributors near you, no matter in what section of the United States you may live. Other countries are covered by distributors who are well informed and capable, some of them having spent some time at the home factory. Home office salesmen, who are in most cases engineers, travel everywhere to assist you in solving any power problems.

For irrigation and reclamation projects usually promoted far from machine shops or expert help of any kind, Bessemers are peculiarly adapted, due to their simplicity and reliability. That which makes them best for such installations also makes them best for crowded cities.

You run absolutely no risk in purchasing a Bessemer. Our guarantees are good. You will receive more than full value for the investment you are asked to make. We ask your patronage on the straight business proposition that we can serve you best.

THE BESSEMER GAS ENGINE CO.

OIL FIELD MACHINERY • COMPRESSORS

Other Bessemer Publications

In addition to this catalogue of Bessemer Oil Field Engines, The Bessemer Gas Engine Company has published the following catalogues and booklets which will gladly be sent you free, upon request.

BESSEMER DIESEL OIL ENGINE CATALOGUE, descriptive of the Diesel Vertical Oil Engine (stationary type), Diesel Vertical Oil Engine (marine type). Built in 3, 4 and 6-cylinder styles from 50 H. P. to 1000 H. P.

BESSEMER TYPE OD OIL ENGINE CATALOGUE. A catalogue descriptive of the Bessemer Type OD Oil Engine, built in sizes to 35 H. P., and widely used in the oil fields as well as in the smaller factories, mills, mines, etc. A quality engine sold at a low price.

BESSEMER OIL ENGINE CATALOGUE, describing Type IV Bessemer Oil Engines ranging in size from 25 H. P. to 180 H. P. The oil engine that combines simplicity and economy. Operates on crude and fuel oils.

BESSEMER MANUAL OF GASOLINE RECOVERY. A technical treatise on the gasoline-from-gas industry by the use of the compression method. Contains scores of pages of the most valuable information for present and prospective owners of gasoline plants.

THE BLUE BOOK OF BESSEMER BUYERS, listing the names of hundreds who have purchased Bessemers and profited thereby and illustrating many installations.

A MANUAL OF INSTRUCTION ON THE BESSEMER GAS ENGINE. An illustrated booklet on the care and operation of Bessemer Gas Engines.

A MANUAL OF INSTRUCTION ON THE BESSEMER OIL ENGINE. An illustrated booklet treating on the care and operation of Bessemer Oil Engines.

A BULLETIN ON THE TYPE TEN DIRECT GAS ENGINE DRIVEN COMPRESSOR.

A BULLETIN ON THE BESSEMER 45 GAS DRILLING ENGINE.

THE BESSEMER MONTHLY, a house organ published each month containing much original technical information of value. Also much of a popular nature. A monthly magazine of Bessemer progress.

THE BESSEMER GAS ENGINE COMPANY

GROVE CITY, PA.

Dimension Sheet for Bessemer Gas Engines

NOTE.—The diameter and face of fly wheels may vary slightly to suit the various requirements. The shipping weight of engines as given is only approximate. Up to and including 22½ H. P. O. C. add 1100 lbs. to engine's weight, and from 25 to 35 H. P. add 1300 lbs., providing engine is to be equipped with reverse clutch.

Type of Engine	Brake Horse Power	Diameter of Cylinder	Stroke of Engine	Speed of Engine	Cross-head Bearing Lower Side, Shoe Surface, Diam.	Diam. of Cross-head Wrist Pin	Length of Cross-head Wrist Pin	Diam. of Main Shaft Bearing	Diameter of Crank Pin	Length of Crank Pin	Length of Piston Head	Diameter of Exhaust Pipe	Diameter of Air Pipe	Diameter of Gas Pipe	Diameter of Water Inlet	Diameter of Water Outlet	Diameter of Fly Wheel	Width of Face of Fly Wheel	Weight of Fly Wheel	Floor Space Required for Engine	Approximate Shipping Weight	Cubic Feet Masonry in Foundation
Open Case Single Cylinder	8	6½	9	250	38	2½	2½	3½	3½	2¾	9½	2½	2	¾	¾	¾	47	3¼	300	53x77	2450	28
	10	7½	10	225	40	2½	2½	3½	3¾	3¼	10½	2½	2	¾	¾	1	52	3¾	500	55x94	2950	48
	12½	8½	12	200	45	2¾	3	4	4	4	12½	3	2	¾	¾	1	56	4½	640	58x101	4000	70
	15	9½	15	190	60	3	3	4	4½	4	15½	4	2	¾	¾	2	66	3¾	700	67x117	4850	109
	20	10½	20	180	60	3	3	4	4½	4	15½	4	3	1	2	2	68	4	900	67x117	5450	131
	22½	10	15	180	60	3	3	4	4½	4	15½	4	3	1	2	2	68	4	900	67x117	5650	139
	25	10½	16	180	60	3½	3½	4½	5	4	16½	4	3	1¼	2	2	72	4	950	71x127	6300	155
	25-30	11½	16	180	60	3½	3½	4½	5	4	16½	5	3	1¼	2	2	1250	5½	1250	71x127	7300	155
	30	11½	16	180	70	3½	3½	5	5½	4½	16½	5	3	1¼	2	2	1400	6	1400	77x129	7750	188
	35	12	16	180	70	3½	3½	5	5½	4½	16½	5	3	1¼	2	2	1400	6	1400	77x129	7950	188
Single Enclosed Case Cylinder	15	8½	15	190	78	3	3	4½	4½	4	15½	4	3	1	1	68	6¼	1550	70x116	8350	153	
	20	9½	15	180	78	3	3	4½	4½	4	15½	4	3½	1	1	68	6¼	1550	70x116	8600	153	
	22½	10	16	180	78	3	3	4½	4½	4	15½	4	3½	1	1	68	6¼	1550	70x116	9250	153	
	25	10½	16	180	94	3½	3½	5	5½	4½	16½	6	4	1¼	1	68	7½	1700	74x122	10200	198	
	30	11½	16	180	94	3½	3½	5	5½	4½	16½	6	4	1¼	1	68	7½	1700	74x122	10450	198	
	35	12	16	180	94	3½	3½	5	5½	4½	16½	6	4	1¼	1	68	7½	1700	74x122	10900	198	
	40	12	18	180	110	4½	5	6	6½	5½	18¾	6	4	1¼	1	76	7	1800	85x134	13100	245	
	50	13½	18	180	110	4½	5	6	6½	5½	18¾	6	5	1½	1½	76	7	2100	85x141	15750	322	
	60	13½	20	180	110	4½	5	7	7	5½	21	8	5	2	2	76	8	2350	86x150	17650	358	
	70	14½	20	180	110	4½	5	7	7	5½	21	8	6	2	2	76	8	2350	86x150	18300	358	
Twin Cylinder Enclosed Case	80	16	20	180	110	4½	5	7	7	5½	21	8	6	2	2	76	8	2350	86x150	18850	358	
	45	10	15	180	78	3	3	4½	4½	4	15½	4	3½	1	1	72	4	1050	138x118	13600	270	
	65	11½	16	180	94	3½	3½	5	5½	4½	16½	6	4	1¼	1	70	6	1700	113x123	16050	339	
	75	12	16	180	94	3½	3½	6	6½	5½	16½	6	4	1¼	1	1800	6	1800	127x130	17750	512	
	85	12	18	180	110	4½	5	6	6½	5½	18¾	6	4	1¼	1	1800	6	1800	127x140	20150	517	
	110	13½	18	180	110	4½	5	6½	6½	5½	18¾	8	5	1½	1½	2100	7	2100	131x141	24450	529	
	125	13½	20	180	110	4½	5	7	7	5½	21	8	5	2	2	2350	8	2350	136x148	28650	587	
	150	14½	20	180	110	4½	5	7	7	5½	21	8	6	2	2	78	12	3300	139x148	29400	595	
	165	16	20	180	110	4½	5	7	7	5½	21	8	6	2	2	78	12	3300	144x153	29800	600	

THE BESSEMER GAS ENGINE CO.



Users of Bessemers agree with the Jury of Awards—
THE BESSEMER IS A GOLD MEDAL ENGINE

The Bessemer Gas Engine Company Grove City, Pennsylvania

Builders of

Bessemer Gas and Oil Engines for Oil Field, Commercial, Electric Light Work, etc.;
Bessemer Roller Pumping Powers; Bessemer Gas and Oil Engine
Driven Air Compressors; Bessemer Direct Driven Pumps;
Bessemer Marine Oil Engines

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Mexia, Tex.	Winchester, Ky.
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	Bartlesville, Okla.
	Wooster, Ohio
	Eldorado, Ark.
	Shreveport, La.

Warehouses in all active oil fields of the United States carrying complete stock of
Bessemer Oil Field Products

Distributors in many other U. S. cities and throughout the World

GAS AND OIL ENGINES

